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# Cost of Production.

J. A. WILD.

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ASCERTAINING

# COST OF PRODUCTION

AN EXPLANATION OF PRINCIPLES

AND

A GUIDE TO PRACTICE

FOR THE

PRINTING AND ALLIED TRADES

WITH

CHAPTERS ON THE APPLICATION OF THOSE PRINCIPLES

TO

OTHER INDUSTRIES.

BY

JOHN A. WILD.

SECOND EDITION. REVISED AND ENLARGED.

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## AUTHOR'S PREFACE.

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THE purpose of this volume is to explain the basic principles of Ascertaining Cost of Production, also to outline a System of Costing which will secure efficient management and avoid unprofitable trading.

Believing that worked examples will enable the reader to more fully understand the principles involved than any amount of explanation in the text, the volume is liberally illustrated by such means.

Though originally written for the Printing and Allied Trades, where the necessity of accurate costing has long been apparent, the principles are such as can, and have been, successfully applied to other industries.

Chapters are now included on the application of the principles to Pottery Manufacture, also to Cotton Spinning and Weaving, two of the great localised industries of this country.

It necessarily follows that anyone with a sound knowledge of the basic principles of costing, and having the necessary technical knowledge can draft the necessary forms and apply the system to any industry.

The figures in the worked examples are taken from the first edition and are, therefore, on a pre-war basis, it being impossible to take them on the rates arising out of the war as cost of wages, materials, &c., have so little stability.

This, however, makes it more and more evident that scientific costing is the only sure anchor of the progressive man of business.

This work is the outcome of many years' special study and practical application of the subject, and is written with a genuine desire to assist manufacturers in arriving at the cost of the various departments and of the articles produced.

It is hoped that those readers who, in the past, may have regarded costing as a useless luxury, will give the contents careful consideration, and that all who read this volume will find it helpful in many ways.

The author takes this opportunity of thanking all those friends to whom the first edition appealed and who received it so kindly. The success of this first edition has induced the author, on his return from service, and finding the work out of print, to re-write and amplify some portion of the text and to add new chapters, particularly with reference to the application of the principles involved to other industries, and he hopes that this edition will prove even more useful than its predecessor.

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## CHAPTER I.

# INTRODUCTION.

THE methods of ascertaining costs at present in vogue are many and varied. Nearly every manufacturer has a system of his own, probably handed down from generation to generation, improved, or altered from time to time, patched here and there with bits from other systems, with little or no regard whatever to the underlying basic principles of ascertaining Cost of Production.

Uniformity is in most cases lacking, and it is evident that the variety of systems of estimating and of ascertaining cost, by means of which the selling price is fixed, leads to much confusion and unprofitable trading.

It accounts almost wholly for the lack of stability in prices quoted, and the unremunerativeness of many businesses.

Twenty printers whose wage bills vary from £300 to £25,000 per annum have supplied detailed estimates for a given job, showing how they calculate their cost and base their charges for working expenses and profit.

In the analysis of these figures lies the secret and the solution to this most difficult problem.

## COMPETITIVE ESTIMATES.

500 Demy 8vo Booklets, 32 pp. inside set in long primer solid 24 ems wide, 42 ems deep; printed on 24lb. demy @ 4/- ream; 4-page cover 1st page only printed, about 10 lines display matter, on paper 10/- ream demy; wire stitched, two wires through back.

| Firm | Paper | Comp. | Mach. | Ink | Bindery | TOTAL | Per cent. for Exs. | | | TOTAL COST | Per cent. for Profit | | | SELLING VALUE | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Labour | Material | Amount | | Labour | Material | Amount | | |
| | £ s d | £ s d | £ s d | £ s d | £ s d | £ s d | | | £ s d | £ s d | | | £ s d | £ s d | |
| 1 | 0 12 0 | 3 19 6 | 0 12 6 | 0 0 6 | 0 3 3 | 5 7 9 | 80 | .. | 3 16 3 | 9 4 0 | 10 | 10 | 0 18 5 | 10 2 5 | Comp. 8d. Mach. 1/- Cuttg. 1/- |
| 2 | 0 12 0 | 5 12 6 | 0 18 9 | 0 0 6 | 0 3 10 | 7 7 7 | 50 | .. | 3 7 6 | 10 15 1 | 10 | 10 | 1 1 6 | 11 16 7 | Comp. 1/3 Mach. 1/6 Cuttg 1/- |
| 3 | 0 12 0 | 4 16 0 | 0 5 0 | .. | 0 3 6 | 5 16 6 | .. | .. | .. | 5 16 6 | 25 | 25 | 1 9 1 | 7 5 7 | Bindery 33⅓% |
| 4 | 0 11 0 | 4 16 0 | 1 5 0 | .. | 0 8 0 | 7 0 0 | .. | .. | .. | 7 0 0 | 15 | 15 | 1 1 0 | 8 1 0 | [50% |
| 5 | 0 11 6 | 3 12 6 | 0 5 4 | 0 1 3 | 0 2 10 | 4 13 5 | * | 25 | 2 11 1 | 7 5 6 | 33⅓ | 33⅓ | 2 9 6 | 9 15 0 | *Comp. 60% Mach. 75% Bindery |
| 6 | 0 11 3 | 4 17 6 | 0 13 3 | 0 0 6 | 0 4 9 | 6 7 3 | .. | .. | .. | 6 7 3 | 33⅓ | 33⅓ | 2 2 5 | 8 9 8 | Comp. 32 @ 3/- Cover 1/6 Mach. 1/- |
| 7 | 0 11 9 | 4 2 6 | 0 12 0 | 0 1 6 | 0 3 3 | 5 11 0 | * | * | 2 5 0 | 7 16 0 | 15 | 15 | 1 4 0 | 9 0 0 | Comp. 32 @ 2/6 *25% on Sell. Value |
| 8 | 0 11 1 | 6 5 6 | 0 6 9 | 0 0 5 | 0 4 1 | 7 7 10 | .. | .. | .. | 7 7 10 | 33⅓ | 33⅓ | 2 9 8 | 9 17 6 | Comp. 1/- Mach. 1/- Read. 1/3 |
| 9 | 0 11 3 | 5 11 0 | 0 10 0 | 0 2 0 | 0 2 6 | 6 16 9 | 75 | 10 | 4 13 9 | 11 10 6 | 25 | 25 | 2 17 6 | 14 8 0 | [Mach. 1/6 Cuttg. 1/- |
| 10 | 0 11 0 | 2 18 6 | 0 7 6 | .. | 0 2 3 | 3 19 3 | 80 | 10 | 2 16 1 | 6 15 4 | 10 | 10 | 0 14 8 | 7 10 0 | Comp. 7d. 1,000 ens Cover 1/6 |
| 11 | 0 11 3 | 3 11 3 | 0 10 0 | 0 1 0 | 0 4 0 | 4 17 6 | .. | .. | .. | 4 17 6 | 33⅓ | 33⅓ | 1 12 6 | 6 10 0 | Mach. 2/- |
| 12 | 0 11 6 | 4 9 0 | 0 6 6 | 0 2 0 | 0 2 7 | 5 11 7 | .. | .. | .. | 5 11 7 | 33⅓ | 33⅓ | 1 17 2 | 7 8 9 | Comp. 9d. Read. 1/- Mach. 1/- |
| 13 | 0 11 7 | 3 7 0 | 0 7 0 | .. | 0 4 6 | 4 10 1 | .. | .. | .. | 4 10 1 | 33⅓ | 33⅓ | 1 10 0 | 6 0 1 | Comp. 8d. Mach. m.-r. 8d., run. 2/- |
| 14 | 0 11 9 | 5 8 0 | 1 10 0 | .. | 0 6 0 | 7 15 9 | .. | .. | . | 7 15 9 | 25 | 25 | 1 19 0 | 9 14 9 | Comp. 36 pp. @ 3/- |
| 15 | 0 13 0 | 3 15 0 | 0 8 0 | .. | 0 2 6 | 4 18 6 | 20 | .. | 0 17 0 | 5 15 6 | 50 | .. | 2 11 3 | 8 6 9 | |
| 16 | 0 11 3 | 4 10 0 | 0 15 6 | .. | 0 5 0 | 6 1 9 | .. | .. | .. | 6 1 9 | 30 | 30 | 1 15 9 | 7 17 6 | Comp. 1/- |
| 17 | 0 11 3 | 2 9 6 | 0 6 6 | .. | 0 5 0 | 3 12 3 | .. | .. | .. | 3 12 3 | 33⅓ | 33⅓ | 1 4 0 | 4 16 3 | Comp. 33 pp. @ 1/6 |
| 18 | 0 12 0 | 6 19 0 | 0 15 8 | 0 0 6 | 0 4 4 | 8 11 6 | 50 | .. | 3 19 6 | 12 11 0 | 10 | 10 | 1 5 1 | 13 6 1 | Comp. 1/2 Mach. 1/3 Bindery 33⅓% |
| 19 | 0 12 0 | 4 0 0 | 0 12 6 | 0 0 6 | 0 3 6 | 5 8 6 | 25 | 25 | 1 7 2 | 6 15 8 | 25 | 25 | 1 13 11 | 8 9 7 | Comp. 8d. Mach. 1/- |
| 20 | 0 12 0 | 5 2 6 | 0 18 9 | 0 0 6 | 0 4 6 | 6 18 3 | 50 | .. | 3 2 10 | 10 1 1 | 10 | 10 | 1 0 1 | 11 1 2 | Comp. 1/3 Mach. 1/6 Bindery 33⅓ % |

## COMPETITIVE ESTIMATES—*continued.*

5,000 ditto.

| Firm | Paper | Comp. | Mach. | Ink | Bindery | TOTAL | Per cent. for Exs. | | | TOTAL COST | Per cent., for Profit. | | | SELLING VALUE | REMARKS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | Labour | Material | Amount | | Labour | Material | Amount | | |
| | £ s d | £ s d | £ s d | £ s d | £ s d | £ s d | | | £ s d | £ s d | | | £ s d | £ s d | |
| 1 | 5 12 0 | 3 19 6 | 1 10 0 | 0 2 6 | 0 14 1 | 11 18 1 | 80 | .. | 4 19 3 | 16 17 4 | 10 | 10 | 1 13 8 | 18 11 0 | |
| 2 | 5 12 0 | 5 12 6 | 2 5 0 | 0 2 6 | 0 17 1 | 14 9 1 | 50 | .. | 4 7 3 | 18 16 4 | 10 | 10 | 1 17 8 | 20 14 0 | |
| 3 | 5 15 0 | 4 16 0 | 1 12 6 | .. | 1 16 6 | 14 0 0 | .. | .. | .. | 14 0 0 | 25 | 25 | 3 10 0 | 17 10 0 | |
| 4 | 3 10 0 | 4 16 0 | 4 15 0 | .. | 2 0 0 | 15 1 0 | .. | .. | .. | 15 1 0 | 15 | 15 | 2 5 0 | 17 6 0 | Halved inside Paper |
| 5 | 5 9 9 | 3 12 6 | 0 17 2 | 0 6 3 | 1 3 7 | 11 9 3 | * | 25 | 4 17 1 | 16 6 4 | 33⅓ | 33⅓ | 5 9 8 | 21 16 0 | *Comp. 60% Mach 75% Bindery 50% |
| 6 | 5 11 6 | 4 18 6 | 1 10 6 | 0 4 6 | 1 17 0 | 14 2 0 | .. | .. | .. | 14 2 0 | 33⅓ | 33⅓ | 4 14 0 | 18 16 0 | |
| 7 | 5 16 0 | 4 2 6 | 1 16 0 | 0 15 0 | 0 15 0 | 13 4 6 | * | * | 5 6 3 | 18 10 9 | 15 | 15 | 2 14 3 | 21 5 0 | *25% on Selling Price |
| 8 | 5 10 8 | 6 5 6 | 1 3 3 | 0 2 6 | 1 5 1 | 14 7 0 | .. | .. | .. | 14 7 0 | 29 | 29 | 4 3 0 | 18 10 0 | |
| 9 | 5 10 0 | 5 11 0 | 1 16 0 | 0 15 0 | 0 17 6 | 14 9 6 | 75 | 10 | 6 16 0 | 21 5 6 | 25 | 25 | 5 6 6 | 26 12 0 | |
| 10 | 5 6 6 | 2 18 6 | 1 1 6 | .. | 1 2 6 | 10 9 0 | 80 | 10 | 4 12 8 | 15 1 8 | 10 | 10 | 1 10 4 | 16 12 0 | |
| 11 | 5 10 3 | 3 11 3 | 2 5 0 | 0 12 0 | 1 10 0 | 13 8 6 | .. | .. | .. | 13 8 6 | 30 | 30 | 4 1 6 | 17 10 0 | |
| 12 | 5 12 6 | 4 9 0 | 1 10 0 | 0 7 6 | 1 0 10 | 12 19 10 | .. | .. | .. | 12 19 10 | 25 | 25 | 3 4 11 | 16 4 9 | |
| 13 | 5 14 3 | 3 7 0 | 1 16 0 | 0 2 0 | 1 12 6 | 12 11 9 | .. | .. | .. | 12 11 9 | 33⅓ | 33⅓ | 4 3 11 | 16 15 8 | |
| 14 | 3 10 0 | 5 8 0 | 5 0 0 | .. | 1 10 0 | 15 8 0 | .. | .. | .. | 15 8 0 | 25 | 25 | 3 17 0 | 19 5 0 | Halved inside Paper |
| 15 | 5 10 3 | 3 15 0 | 1 12 6 | .. | 1 2 6 | 12 0 3 | 20 | 10 | 1 17 3 | 13 17 6 | 50 | .. | 3 18 0 | 17 15 6 | |
| 16 | 5 12 6 | 4 10 0 | 2 12 6 | 0 4 0 | 1 15 0 | 14 14 0 | .. | .. | .. | 14 14 0 | 29 | 29 | 4 6 0 | 19 0 0 | |
| 17 | 5 10 6 | 2 9 6 | 1 17 6 | .. | 2 10 0 | 12 7 6 | .. | .. | .. | 12 7 5 | 33⅓ | 33⅓ | 4 2 6 | 16 10 0 | |
| 18 | 5 12 0 | 6 19 0 | 1 17 6 | 0 2 6 | 0 18 9 | 15 9 9 | 50 | .. | 4 17 8 | 20 7 5 | 10 | 10 | 2 0 9 | 22 8 2 | |
| 19 | 5 12 0 | 4 0 0 | 1 10 0 | 0 2 6 | 0 14 0 | 11 18 6 | 25 | 25 | 2 19 8 | 14 18 2 | 25 | 25 | 3 14 7 | 18 12 9 | |
| 20 | 5 12 0 | 5 2 6 | 2 5 0 | 0 2 6 | 0 17 8 | 13 19 8 | 50 | .. | 4 2 7 | 18 2 3 | 10 | 10 | 1 16 3 | 19 18 6 | |

In the foregoing estimates it will be noticed that:

No. 5 departmentalises his expenses and calculates them as a separate and varying percentage on each department.

Nos. 18 and 20 use a rate per hour to cover wages and departmental expenses, which we will call process cost, and calculate their general charges as a percentage on that process cost.

Nos. 1, 9, 10, and 15 put 75 per cent. or 80 per cent. on to the total productive wages to cover departmental and general charges.

No. 13 calculates his composition and make-ready on machine at bare wage cost, but his running at 2s. per hour—a most remarkable arrangement, scarcely consistent with actual cost.

Others vary their method and calculate something for expenses and profit on the total of labour and material; whilst one printer goes so far as to calculate his general charges upon his selling value.

Of these various methods, the most sensible to my mind, the most accurate, the one which gives the best financial results, irrespective of the class of trade quoted for, is that adopted by No. 20.

The basic principle involved is a rate per hour for each process to cover the cost of wages, and departmental expenses, called process cost, thus:

| | |
|---|---|
| Material .. .. .. .. | |
| Process Cost .. .. .. .. | |
| General Charges, 50 per cent. on Process Cost .. | |
| Total Cost .. .. .. | £ |
| Ten per cent. Profit .. .. | |
| Selling Value .. .. .. | £ |

Let us consider the question and assume that the expenses of a concern for a period are:

| | |
|---|---|
| Productive Material Consumed .. .. | £9,000 |
| ,, Wages .. .. .. | 9,000 |
| Working Expenses—Departmental .. .. | 3,000 |
| ,, ,, General .. .. | 6,000 |
| Total Cost .. .. .. | £27,000 |

Departmental expenses will vary according to the departments, so must be calculated upon their respective departments, but general expenses are a charge upon the total production, and should be calculated upon that production.

For our illustration, however, we will add our departmental and general charges together, and call them working expenses.

Working expenses are either 100 per cent. of the productive wages, or 50 per cent. of productive wages and material.

Suppose two firms are in competition, one basing its expenses as 100 per cent. on productive wages, and the other reckoning 50 per cent. on the total of productive wages and material.

Three jobs come along, consisting of—

| | Job No. 1 | Job No. 2 | Job No. 3 |
|---|---|---|---|
| Material .. .. .. .. | £55 | £10 | £100 |
| Wages .. .. .. .. | £55 | £100 | £10 |

A. quotes 100 per cent. on Productive Wages.

| | | | |
|---|---|---|---|
| Material .. .. .. .. | 55 | 10 | 100 |
| Wages .. .. .. .. | 55 | 100 | 10 |
| Working Expenses .. .. | 55 | 100 | 10 |
| Total Cost.. .. .. .. | £165 | £210 | £120 |
| Ten per cent. Profit .. .. | 16 | 21 | 12 |
| Selling Value .. .. .. | £181 | £231 | £132 |

B. quotes 50 per cent. on Productive Wages and Materials.

| | | | |
|---|---|---|---|
| Material | 55 | 10 | 100 |
| Wages | 55 | 100 | 10 |
| Total | £110 | £110 | £110 |
| Working Expenses | 55 | 55 | 55 |
| Total Cost | £165 | £165 | £165 |
| Ten per cent. Profit | 16 | 16 | 16 |
| Selling Value | £181 | £181 | £181 |

Where wages and material are of equal proportion both quote alike, but when one preponderates over the other, system asserts itself.

For job No. 2, A. asks £231, B. quotes £181.
,, No. 3, A. asks £132, B. quotes £181.

Each manufacturer gets a job and blames the other fellow for cutting prices, but both are right in their calculations. Neither is knowingly cutting under, but each is innocently laying himself out to obtain a certain class of trade, and succeeds in his efforts on account of his price.

B. gets plenty of work containing little material. He finds that he is working full time, perhaps overtime for the greater part of the year. His machinery has been running to its utmost capacity, probably he has installed additional plant to cope with the rush of orders, yet his turnover is down because the work produced consists mainly of labour on which he has not reckoned sufficiently high his percentage for working expenses.

His expenses, instead of being—

| | |
|---|---|
| Material Consumed | £9,000 |
| Productive Wages | 9,000 |
| Expenses | 9,000 |
| Total | £27,000 |

are something like this—

| | |
|---|---|
| Material Consumed | £6,000 |
| Productive Wages | 10,000 |
| Expenses | 9,000 |
| Total | £25,000 |

and he has only reckoned on his cost tickets a production of—

| | |
|---|---|
| Material Consumed | £6,000 |
| Productive Wages | 10,000 |
| Total | £16,000 |
| Working Expenses, 50 per cent. | 8,000 |
| Total Production | £24,000 |

The total cost of running his factory is £25,000, he has, therefore, lost £1,000 on manufacturing during the period because he has not reckoned the whole of his expenses in his estimates, nor transferred them to his cost tickets, and the amount unrecovered must be deducted from the profit, or added to the loss shown on jobs in order to reconcile his cost figures of profit or loss with the financial accounts.

Whilst this has been happening to B., what has become of A.? Probably he has not been so successful as B. in obtaining orders. His works have had slack times, his wage bill is down, but his turnover has risen considerably.

As he watched it grow from month to month, he built up hopes of a very prosperous year. He was entirely satisfied with the results, as far as he could see, but when his Audited Accounts and Balance Sheet arrive he is disagreeably surprised to find that the profit he anticipated has not materialised.

His accounts show :—

| | |
|---|---|
| Material Consumed | £12,000 |
| Productive Wages | 8,000 |
| Expenses | 9,000 |
| Total | £29,000 |

as being the relative cost under each heading. Wages are down, expenses are normal, the percentage of expenses to productive wages has gone up, consequently they have been under-recovered by that amount, he has consumed a greater quantity of material on which he will have obtained at least a ten per cent. profit, and which has helped to save him from further disaster.

He has reckoned his estimates and calculated his costs as a production of—

| | |
|---|---|
| **Material Consumed** | £12,000 |
| **Productive Wages** | 8,000 |
| **Working Expenses, 100 per cent.** | 8,000 |
| **Total Production** | £28,000 |

whereas the actual cost of running his works is £29,000, therefore he, too, has lost £1,000 on manufacturing, because his total debits to Work in Progress, or Cost Tickets, is understated by that figure, and the amount unrecovered must be deducted from the profits or added to the losses shown on Cost Tickets in order to reconcile his Costs with his Financial Accounts.

It will be noted that the expenses of A. and B., taken as one concern, are:—

| | |
|---|---|
| **Material Consumed** | £18,000 |
| **Productive Wages** | 18,000 |
| **Working Expenses** | 18,000 |
| **Total** | £54 000 |

There has been no outside influence, no work taken away by other houses, but owing to the different methods of calculating the expenses the jobs have been divided into those which preponderate in Labour and those containing a greater proportion of Material.

The total production of the two establishments is

| | |
|---|---|
| Material Consumed | £18,000 |
| Productive Wages | 18,000 |
| Expenses Recovered | 16,000 |
| **Total Production** | £52,000 |

showing £2,000 loss on manufacturing.

That £2,000 has gone into the pockets of the customers simply because they have played one manufacturer against the other, placed every job up to competition, and taken advantage of the varying bases of recovering the expenses.

Had both these houses calculated their expenses one recognised way, using the same basis, their total production would have been £54,000, the same as their total expenses, and that £2,000 loss on manufacturing would have been avoided.

All of us, in turn, make mistakes in our estimates. Two men in the quotation for 5,000 booklets only reckoned half the paper, some forgot the ink; but these are minor details compared with that most important principle. How do you base your Cost? How do you calculate your Working Expenses?

## CHAPTER II.

## THE BASIC FACTOR.

### DEPARTMENTALISATION ESSENTIAL.

Having carefully considered the previous chapter my readers will now realise the importance of levying the greater portion of the working expenses on labour instead of on the total of labour and materials.

I now wish to go a stage further and show the necessity of departmentalising the working expenses so as to ascertain the actual cost of each department in order that the expenses of each department may be recovered on the production of that department.

Let us say that our factory consists of the following producing departments :—

| LETTERPRESS. | LITHOGRAPHIC. | BINDERY. |
|---|---|---|
| Composition | Artists | Ruling |
| Electro and Stereo | Transfer | Binding |
| L'press, Cylinder | Litho. Machine | Cutting |
| ,, Platen | Bronzing | Folding, Sewing, &c. |

It is quite evident that the same percentage of working expenses is not applicable to each of these departments.

Artists, for instance, will be a cheap department compared with the Litho Machine Department, which costs for every £100 of productive labour nearly five times as much as Artists in Departmental Working Expenses.

Composition cannot be compared with Letterpress Machine, neither can Cutting with Folding and Sewing, and so on. It is absolutely necessary to ascertain the cost of running each of these departments separately, if we are to obtain a fair price for the work done by these various departments.

Let us take again, for instance, two concerns run respectively by Smith and Jones. Each consists of three departments, identical in every respect as regards equipment and efficiency, these departments costing 10 per cent., 33⅓ per cent., and 100 per cent. respectively for departmental working expenses.

Assume that the productive wages are :—

| | | | | |
|---|---|---|---|---|
| A Dept. .. .. .. | £5,000 | .. 10% | D.C. | £500 |
| B ,, .. .. .. | 3,250 | .. 33⅓% | ,, | 1,083 |
| C ,, .. .. .. | 1,750 | .. 100% | ,, | 1,750 |
| Total Productive Wages | £10,000 | | D.C. | £3,333 |

and that the general charges are 50 per cent. of process cost—i.e. productive wages and departmental charges thus :—

| | |
|---|---|
| Productive Wages .. .. .. .. | £10,000 |
| Departmental Charges .. .. .. .. | 3,333 |
| Process Cost .. .. .. .. .. | £13,333 |
| General Charges 50% .. .. .. .. | 6,667 |
| Total .. .. .. .. .. | £20,000 |

Smith reckons his Working Expenses as 100% on Productive Wages viz. :

| | |
|---|---|
| Productive Wages .. | £10,000 |
| Working Expenses .. | 10,000 |
| Total .. .. | £20,000 |

But Jones calculates them on his actual figures for D.C. and G.C., thus :

| | |
|---|---|
| Productive Wages .. | £10,000 |
| D.C. (various) .. | 3,333 |
| Process Cost .. | £13,333 |
| General Charges 50% | 6,667 |
| Total .. .. | £20,000 |

Both are endeavouring to recover the same total working expenses on the same total productive wages, and are in competition for the following jobs :—

| SMITH. | | JONES. | | | |
|---|---|---|---|---|---|
| DEPT. | | DEPT. | | | |
| A. Wages .. .. | £200 | A. Wages .. | £200 | D.C. | £20 |
| B. ,, .. .. | 200 | B. ,, .. | 200 | ,, | 66 |
| C. ,, .. .. | 200 | C. ,, .. | 200 | ,, | 200 |
| Total Wages .. .. | £600 | Total Wages | £600 | D.C. | £286 |
| 100% Expenses .. .. | 600 | D.C... .. | 286 | | |
| Total Cost .. .. | £1,200 | Process Cost | £886 | | |
| | | 50% G.C. .. | 443 | | |
| | | Total Cost | £1,329 | | |

| | | | | | |
|---|---|---|---|---|---|
| DEPT. | | DEPT. | | | |
| A. Wages .. .. | £500 | A. Wages .. | £500 | D.C. | £50 |
| B. ,, .. .. | 50 | B. ,, .. | 50 | ,, | 16 |
| C. ,, .. .. | 50 | C. ,, .. | 50 | ,, | 50 |
| Total Wages .. .. | £600 | Total Wages .. | £600 | D.C. | £116 |
| 100% Expenses .. .. | 600 | D.C. .. .. | 116 | | |
| Total Cost .. .. | £1,200 | Process Cost .. | £716 | | |
| | | 50% G.C. .. | 358 | | |
| | | Total Cost | £1,074 | | |

| | | | | | |
|---|---|---|---|---|---|
| DEPT. | | DEPT. | | | |
| A. Wages .. .. | £50 | A. Wages .. | £50 | D.C. | £5 |
| B. ,, .. .. | 50 | B. ,, .. | 50 | ,, | 16 |
| C. ,, .. .. | 500 | C. ,, .. | 500 | ,, | 500 |
| Total Wages .. .. | 600 | Total Wages .. | £600 | D.C. | £521 |
| 100% Expenses .. .. | 600 | D.C. .. .. | 521 | | |
| Total Cost .. .. | £1,200 | Process Cost | £1,121 | | |
| | | 50% G.C. .. | 560 | | |
| | | Total Cost | £1,681 | | |

These figures forcibly illustrate the fact that even if all manufacturers were to calculate their working expenses upon productive wages, and were to estimate correctly the amount of productive wages, there would still be a great variance in prices quoted unless they all calculated their departmental and general charges on the same basis.

It will be noticed that Smith quotes the same price, irrespective of whether the job is handled in the most expensive, or the least expensive department, whether it consists mainly of machining or bindery work.

As a result, Smith will obtain a much greater amount of machine work than Jones, because he is charging against other departments a proportion of the costs actually incurred in the Machine Room.

He keeps his machines employed fairly well; he will secure those jobs where long runs predominate, but he is starving those departments which, under his system of Costing, are remunerative.

The result again is unprofitable trading, for he only secures those orders which are quoted for at a price below the actual cost.

There is only one remedy, and that is to ascertain costs on a scientific basis—getting down to the bed-rock of process cost—charging to each department or process the expenses incurred in and by that department or process, and recovering those expenses on the production of the respective departments.

Bad manufacturing, inefficient and faulty management, rather than faulty costing, will then be responsible for any losses incurred in manufacturing, and these will be brought to light by the Cost System.

Any losses will be incurred not because of, but in spite of your Cost System.

## CHAPTER III.

## STOCKS AND STOCKTAKING.

I THINK I am safe in saying that the majority of manufacturers have to wait until the end of the financial year before they can ascertain the result of their trading, and in order to obtain the desired information they put into operation that old-fashioned, time-honoured institution, the terror of the storekeeper and the clerks, but the sheet-anchor of the progressive man of business—a stocktaking.

The printing trade offers great obstacles to the ascertainment of stocks by methods applicable to an ordinary business, especially so if Costs are not kept up to date, and on a scientific basis. Work in progress in every condition imaginable makes it almost impossible to describe properly or arrive at a reasonably near value of the goods unless the actual cost to date is ascertainable.

The general method of taking stock is to obtain some sheets of paper, or a book, and walk round the works, putting down each item that is seen, omitting, of course, those not seen, value, extend, and then by adding up the sheets arrive at the approximate value of the Raw Material, Work in Progress, and Finished Work constituting the stocks.

This is often an estimate. It would better be described as a guess, and more often than not, the guess is out—sometimes miles out. Some items are missed altogether, others are

valued twice, so the accountant conducting the audit invariably insists upon the directors certifying the accuracy of the stocks in order to cover himself if things go wrong.

Too often stocks offer the opportunity for the unscrupulous manager to bolster up weak trading or bad manufacturing, and if this goes on for long without being discovered, it is almost certain to result in bankruptcy.

Why? Simply because you take stock to see what you have got, instead of taking stock to see that you actually have what you ought to know should be on the premises.

Stocktaking must be a check upon, not an estimate of, the stocks.

If you know the production of the works and the consumption of the stores, you know your stocks. If you know your stocks, you know the exact financial position of your business.

Many managers endeavour each month to keep touch with the financial position of their business by simply watching the wages paid, material purchased, and expenses incurred, against which they compare the sales. This would not be far wrong if the stocks on hand at the commencement and the close of the period were the same, but this is never so.

The difference between expenses and sales may show the manager a profit of £500; he thinks he is doing well; but if stocks are down £600, he is actually £100 to the bad.

The only item of unknown quantity is the difference in stocks. To know stocks it is necessary to know the production of the works and the consumption of the stores.

## CHAPTER IV.

## ASCERTAINING PRODUCTION—THE ANALYSIS OF WAGES.

Production is the enhanced realisable value of work in progress at the close of the day. It is not the expense incurred that day, because your departments may have been employed wholly non-productively, and your work in progress may not be worth a cent more than it was at the commencement.

The basic factor is productive wages. These are wages paid for a necessary operation of normal production, ascertainable in definite quantities and chargeable to definite orders, all other wages, including spoilt and abortive work, are non-productive.

In order to ascertain the amount of productive wages it is necessary to analyse the wages paid so as to find the amount debited to jobs, and also to enable us, at the close of the period, to ascertain the actual departmental cost by an analysis of expenditure.

The Wages Book should be sectionalised, each department having a sufficient number of blanks, after giving each employee a number, to allow for expansion and new hands.

For illustration, allocate—

Check Nos. 1— 20 to Artists' Department.
,, ,, 21— 50 ,, Transfer ,,
,, ,, 51— 80 ,, Litho Machinemen.
,, ,, 81—120 ,, ,, Feeders.
,, ,, 121—150 ,, Compositors.
,, ,, 151—180 ,, Letterpress Machinemen.
,, ,, 181—220 ,, ,, Feeders.
,, ,, 221—350 ,, Bindery.
,, ,, 351—370 ,, Stone Polishing.
,, ,, 371—375 ,, Motive Power.
,, ,, 376—380 ,, Storekeepers. (Raw Materials.)
,, ,, 381—385 ,, Stockkeepers. (Manufactured Goods.)
,, ,, 386—400 ,, General Charges—Manufacturing.
,, ,, 401—420 ,, ,, ,, Selling.

Every productive worker should be given a time book or time sheet on which to record the time spent, productively or otherwise, on each job.

In the preparatory departments—Artists, Transfer, and Composition—a book of about 50 leaves is advocated. This facilitates reference when doing further work on a job, and prevents errors in quoting order numbers.

### DAILY TIME BOOK.

Name.......................... Date..................19..

| Customer | Description of Job | Work Done | Order No. | Productive Time | | Non-productive Time | | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | H. | M. | H. | M. | |
| | | | Total | | | | | |

| Foreman's Sig. | Checked by | Wages Analysis | Transferred to Costs |
|---|---|---|---|
| | | | |

Special Notice.—It is imperative that complete particulars of every item of the day's employment be entered, and this book placed on the Foreman's desk at the close of each day's work.

Complete particulars of every item of the day's employment should be entered, and this book placed on the foreman's desk at the close of each day's work.

In the Machine Rooms a pad of Daily Time Sheets is used. When wanting a pass the machine man takes his pad, along with a sheet of the job, to the foreman, who fills in the time passed to indicate that make-ready is completed and running is commenced.

When the job is finished the foreman fills in the time off and gives the workman another job.

Only time actually spent Making Ready, Running, Normal Wash-up, Customers' Alterations, &c., i.e. Normal Production, must be entered in the Productive time column. All other items, waiting for forme, stone, &c., i.e. faults of production, are clearly non-productive, and should be entered in the non-productive column.

The Bindery employees should use a loose time-sheet as shown on p. 28. All employees, whether working at time or piece rates should fill in one of these sheets showing how and on what jobs they have spent the day.

This Time Sheet differs from others by having the time printed in quarter hours down the centre of the sheet. On the completion of a job the Time Sheet is ruled right across. Divisions of time spent on different operations of the same job will be shown by ruling across the work done, time, time-work and piece-work columns.

A system similar to this is necessary where employees are constantly changing from time-work to piece-work, or where they are partly engaged on time-work and partly on piece-work on the same day, otherwise the employee is tempted to magnify the time spent at time rates, and minimise the time worked at piece rates in order to have an extra shilling or two at the end of the week.

## MACHINE TIME SHEET.

*Machineman* Smith *Machine No.* 6 *Feeder* James *Date*..................................19......

| Customer | Order No. | Description of Job | Colour | Time passed | Time off | No. of Runs | Productive Time H. | Productive Time M. | Non-productive Time H. | Non-productive Time M. | Remarks |
|---|---|---|---|---|---|---|---|---|---|---|---|
| C. W. Lowe .. | 400 | Tickets .. . | Gold .. | .. | 10 a.m. | 1,200 | 2 | 30 | .. | .. | Running |
| | | | | | | | | 30 | | .. | Wash up |
| 〃 〃 .. .. | 〃 | 〃 .. .. | Red .. | 12 a m. | .. | .. | 1 | 30 | .. | .. | Make ready |
| | | | | | 3.30 p.m. | 1,500 | 2 | 30 | .. | .. | Running |
| | | | | | | | | 30 | .. | . | Wash up |
| | | | | | | | | | | 30 | Wait Stone |
| 〃 〃 .. .. | 〃 | 〃 .. .. | Black .. | 6 p.m. | .. | .. | 1 | 30 | .. | .. | Make ready |
| | | | | | | Total .. | 9 | 0 | | 30 | |

| Foreman's Sig. | Checked by | Wages Analysis | Transferred to Costs |
|---|---|---|---|
| A.K. | C.L. | . | |

Special Notice.—It is imperative that complete particulars of every item of the day's employment be entered, and this placed on the Foreman's desk at the close of each day's work. Only time actually spent Making Ready, Running, Normal Wash-up, or Customers' alterations, i.e. Normal Production, must be entered in the Productive Time Column. All other items, i.e. Faults of Production, to be entered in the Non-productive Time Column and their cause in the Remarks Column.

## BINDERY.

### Daily Time Sheet.

*Employee* White *Machine* No. 316 *Check No.* 221 *Date*............19..

| Order No. | Customer and Job | Work Done | Time | Time-Work Quantity | Time-Work Hours | Piece-Work Quantity | Piece-Work Rate | Piece-Work Per | Remarks |
|---|---|---|---|---|---|---|---|---|---|
| 615 | W. T. Field, Labels | Cutting out | 7.45<br>8.0<br>8.15<br>8.30 | 1,000 | 1 | | | | |
| 160 | Crook & Co., Round Tickets | Cutting out | 8.45<br>9.0<br>9.15<br>9.30<br>9.45<br>10.0<br>10.15<br>10.30<br>10.45<br>11.0<br>11.15<br>11.30 | | | 5,500 | 1½ | *m* | |
| 171 | Brown & Co. | Cutting out | 11.45<br>12.0<br>12.15<br>12.30 | | | | | | |
| | | | 12.45<br>1.0<br>1.15<br>1.30 | | | | | | DINNER |
| | Labels | | 1.45<br>2.0<br>2.15<br>2.30 | 1,500 | 2 | | | | |
| 208 | Smith & Son, Small Labels | Cutting out | 2.45<br>3.0<br>3.15<br>3.30<br>3.45<br>4.0<br>4.15<br>4.30<br>4.45<br>5.0<br>5.15<br>5.30<br>5.45<br>6.0 | | | 18,000 | ¾ | *m* | |
| | | | 6.15<br>6.30 | | | | | | |
| | | | 6.45<br>7.0<br>7.15<br>7.30<br>7.45<br>8.0<br>8.15<br>8.30 | | | | | | |

Instructions.—All employees, whether working on Time or Piece, must fill in one of these sheets. On the completion of a Job, the sheet will be ruled right across. Divisions of time spent on different operations of the same Job will be shown by ruling across the "Work Done" Column, under the time and across the "Time-Work" and "Piece-Work" Columns. Quantities and Order Nos. in all cases to be entered correctly.

| Foreman's Sig. | Checked by | Wages Analysis | Transferred to Costs |
|---|---|---|---|
| J. B. | C. L. | | |

The quarter-hour Time Sheet prevents this, and serves as a valuable check upon your piece rates, the actual time spent on piece-work being automatically obtained.

Every employee engaged upon productive work makes out a Daily Time Record, showing how and on what jobs he has spent his time. These are initialled by the foreman, and the following morning are sent down to the Cost Office, where the time booked is checked with the clock or the timekeeper's records, and the time extracted to the Wages Book, as shown on pp. 30 and 31.

All items which go into the Productive Section of the Wages Analysis will afterwards be debited to the various Cost Tickets representing Work in Progress.

All items which go into the Non-productive Section will later on be charged against the various departments, and must, of course, be recovered as part of their departmental or general charges.

Occasionally labour may be lent from one department to another, and then it is necessary to send a Labour Lent form to the Cost Office, in order that the wages may be charged to the borrowing department.

### LABOUR LENT.

By.............Dept. to.............Dept. Date...........19..

| Name of Person Lent | Check No. | Time H. | Time M. | Job Engaged On | Order No. | Time H. | Time M. |
|---|---|---|---|---|---|---|---|
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |
| | | | | | | | |

| Foreman's Signature | Wages Transferred by | Foreman of Lending Department must see that this form is sent to the cost office so that credit may be given his department. | Cost Transferred by | Foreman's Signature |
|---|---|---|---|---|
| | | | | |

## WAGES BOOK AND ANALYSIS OF WAGES.

Composing Dept. Week ending........................19...

| No. | Name | Work done | Daily Time |  |  |  |  |  | Hours worked |  |  | Rate | Wages paid | Productive Wages | Non-Productive Wages |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | M. | Tu. | W. | Th. | F. | S. | Total | P. | N.P. |  | £ s d | £ s d | £ s d |
| 121 | Smith.. .. .. | Supervision | 9½ | 9½ | 9½ | 9½ | 9½ | 4½ | 52 | — | 52 | 40/- | 2 0 0 | — | 2 0 0 |
| 122 | Jones.. .. .. | Prod. ..<br>Dis. .. | 8½<br>1 | 8<br>1½ | 8<br>1½ | 7½<br>2 | 8<br>1½ | 3<br>1½ | 52 | 43 | 9 | 36/- | 1 16 0 | 1 9 9 | 0 6 3 |
| 123 | Brown .. .. | Prod ..<br>Dis. .. | 7<br>2½ | 9<br>½ | 8½<br>1 | 9<br>½ | 8<br>1½ | 4<br>½ | 52 | 45½ | 6½ | 36/- | 1 16 0 | 1 11 6 | 0 4 6 |

## WAGES BOOK AND ANALYSIS OF WAGES.

Bindery Dept. Week ending........................191....

| No. | Name | Work Done | Daily Time or Quantity |  |  |  |  |  | Total Hours or Quantity |  |  | Rate | Wages Paid | Productive Wages | Non-Productive Wages |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
|  |  |  | M | Tu. | W. | Th. | F. | S. | Total | P. | N.P. |  | £ s d | £ s d | £ s d |
| 221 | White .. | Prod. .<br>N.P. ..<br>Cutting .. | 4½<br><br>13 000 | 3<br><br>13,500<br>9,000 | 3<br><br>5,500<br>18,000 | 9½ | 9½ | 4<br>½ | 34<br><br>32,000<br>27.000 | 33½ | ½ | 6/6<br><br>1½ in.<br>¾ in. | 0 9 11 | 0 4 2<br>0 4 0<br>0 1 8 | 0 0 1 |
| 222 | James .. | Prod. ..<br>Cleaning .. | 9½ | 5½<br>4 | 9½ | 9½ | 9½ | 4½ | 52 | 48 | 4 | 6/- | 0 6 0 | 0 5 6 | 0 0 6 |
| 223 | Wright .. | Wire Stitch | 5,000 | 5,000 | 5,000 | 5,000 | 5,500 | 2,500 | 28,000 |  |  | 6d. | 0 14 0 | 0 14 0 |  |

## ANALYSIS OF LITHO MACHINERY OUTPUT..........19....

Non-productive Hours.

| Machine No. | No. of Changes | Productive Hours | | | | No. of Runs | Rate per hour | D.C. Recovered. | | | Machine | | | Waiting for | | | | | Spoilt and Abortive Work | | | | | Sundries | Machine Standing | Total Working Hours |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Make ready | Running | Wash up | | | | £ | s | d | Clean Mach. Oiling, and Starting | Clean Dampers, &c. | Repairs and Alterations | Instructions | Stone | Paper | Ink | Bronzing | Misfit | Stone Lift & Re-M.R. | Running Tickmarks | Stone Roll and Alts. | Paper Creasing | | | |
| Rotary Machines. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 1 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Quad Demy Flat Beds. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 4 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 5 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 6 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Double Demy Flat Beds | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 9 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 10 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 11 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 12 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Demy and Smaller Flat Beds. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 13 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 14 | | | | | | | | | | | | | | | | | | | | | | | | | | |
| DAILY SUMMARY. | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Rotary | | | | | | | | | | | | | | | | | | | | | | | | | | |
| Q.D.Flat | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D.D. " | | | | | | | | | | | | | | | | | | | | | | | | | | |
| D. " | | | | | | | | | | | | | | | | | | | | | | | | | | |

The number of productive hours worked by each class of machine is ascertained by means of an Analysis of Machinery Output (p. 32). From this analysis, which is a most important record, the manager should see that the average number of runs per hour is maintained. and prevent the leakage of time and money, which is often the curse of the Machine Room.

The details for this form are all recorded on the Machinemen's Time Sheet (p. 27).

The final summary of this form is invaluable. It ascertains the actual number of runs produced; the average number of runs per hour for a period; fixes your basis for estimating; and solves that most vexed of all questions, the productive capacity of your machinery.

The percentage for departmental charges, or the number of productive hours transferred to Cost Tickets at a rate per hour, added to the productive wages, gives you the total process cost on which to calculate the general charges, and so ascertain the production to date.

Knowing the production of the works and the expenses incurred in production, we have effective control of the various departments, and if the various stores also are kept in an efficient manner we have only to adjust the profit shown on completed jobs in order to ascertain the exact financial position at any moment.

# CHAPTER V.

## CONSUMPTION OF STORES.

PURCHASES of raw material for stores are not an expense, being only an exchange of equal assets. Whether the cash is in the bank or the material in stores does not matter. The Trading Account is not affected until the item is consumed.

### MATERIAL ISSUED FROM PAPER STORES.

Day of Week................ Date..............19.... No.....

| Stock No. | Sheets Issued | Weight | Size | Description | Order No. | Price per | Productive | Non-productive | Stores Ledger Folio |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | £ s d | £ s d | |
| | | | | | | | | | |

| Entered by | Extended by | Checked by | Transferred by | | | |
|---|---|---|---|---|---|---|
| | | | | Total .. £ | | |

An exactly similar book will be kept for Material Returned to Paper Stores.

### MATERIAL ISSUED FROM INK STORES.

Day of Week............. Date...............19..... No......

| Order No. | Customer | Description | Ink | Varnish | Price per | Productive | Non-productive | Stores Ledger Folio |
|---|---|---|---|---|---|---|---|---|
| | | | lbs. oz. | gal. pts. | | £ s d | £ s d | |
| | | | | | | | | |

| Entered by | Extended by | Checked by | Transferred by | | | |
|---|---|---|---|---|---|---|
| | | | | Total .. £ | | |

A similar book is also kept for material returned to Ink Stores, also for material issued from and returned to all other stores.

These books are kept in duplicate, the second page, being a carbon copy of the original entry, is retained in the book, the first page being perforated to tear out, and at the close of the day sent down to the Cost Office.

All material issued is then calculated, that charged to jobs being run out into the Productive column. That charged to departments or office in the Non-productive column. These columns are totalled, thus arriving at the total consumption for that day.

By this means the Stores are credited with the value of productive material issued and Work in Progress is debited. Non-productive material is debited to the departments consuming same, and is recovered in their departmental charges.

If we charge all material purchased to a Stores Account, and if we obtain a correct record of the material issued from stores, we know the consumption and also the value of stock on hand.

Therefore, as Stores Consumed is the item which goes into the Trading Account, the employees in charge of the various stores must be held responsible for the correct recording of material issued or returned in the books provided for that purpose.

You must know consumption in order to control the stores. The opening stocks, plus purchases, should equal consumption plus closing stocks. Now we have arrived at a stage when it is impossible to juggle with stocktaking, for, knowing consumption, we know what the closing stocks should be.

The Material Issued and Returned Books provide the original record from which the various accounts in the Stores Ledger should be posted.

Laxity in looking after stores, in the issue of material and the recording of it, is a frequent source of loss to many houses.

If it is necessary to keep your cash locked up, is it not necessary to keep your material, which is only cash in another form, on a proper basis? If you have special books in which to record your cash, is it not just as necessary to record your material? If you do not look after your cash it disappears. If you neglect your material it will vanish, and the amount unaccounted for can only be treated as a loss.

If large stocks of mill supplies are kept, i.e. Cleaning Materials, Oils, &c., they should be treated as a store, although they will not be consumed as a productive item, but as a departmental expense. They should be issued on the requisition of a department, and Mill Supplies Stores will be credited, and the department debited. This is essential when several departments use the same materials, unless those materials are purchased directly for the use of the separate departments.

Finished or partly finished goods which are put to stock and held in stock for a time should be collected and formed into another Store or Stock; although they are not actually Raw Materials, they should be treated in the same manner, the price at which they are put to stock being the cost of manufacture up to their present stage. There will be a book for goods received in Manufactured Stock, and another for goods issued from Manufactured Stock.

## GOODS RECEIVED IN MANUFACTURED STOCK.

Date........................19.... No.......

| Order No. | Customer | Description | Quantity | Size | Price per | Value | Stock Ledger Folio |
|---|---|---|---|---|---|---|---|
| | | | | | | £ s d | |

| Entered by | Extended by | Checked by | Transferred by | Total .. £ |
|---|---|---|---|---|
| | | | | |

Goods received in Manufactured Stock will, as a general rule, be from Work in Progress. Manufactured Stock would, therefore, be debited and Work in Progress credited.

The Manufactured Stock thus becomes the raw material to issue for further work as may be required.

All we now require is a summary of our various Material Issued or Returned Books in order to ascertain the total consumption for a period, and we obtain this on the following form :—

### SUMMARY OF STORES CONSUMED.

Consumption of........................Stores ............19....

| Material Issued | | | | Material Returned | | | | Analysis of N.P. Material | |
|---|---|---|---|---|---|---|---|---|---|
| Date | M.I.B. Folio | Productive | Non-productive | Date | M.R.B. Folio | Productive | Non-productive | Department | Amount |
| | | £ s d | £ s d | | | £ s d | £ s d | | £ s d |
| | Total .. £ | | | Total .. £ | | | | Total .. £ | |

Modern business demands a careful attention to detail. It is necessary to see that every scrap of material issued and consumed is accounted for, otherwise your profit will not materialise.

The difference between the actual expenses incurred and the production obtained, added to the profit or loss shown on costs of completed jobs, gives the Balance Sheet figure of Profit or Loss, provided that you have eliminated the question of stocks by careful and scientific storekeeping.

## CHAPTER VI.

## ASCERTAINING DEPARTMENTAL COST—THE ANALYSIS OF EXPENSES.

Before we can analyse the expenses for the period, as shown by the Trading Account, over the various departments, we require a Summary of the Wages Analysis, showing the amount of Productive Wages, and also the amount of Non-productive Wages in each department.

### SUMMARY OF WAGES AND PRODUCTION.

..............Dept. ..............Months ending..........19..

| Week Ending | Wages Paid | | | Percentage of Non-Productive Wages to Total Wages | Summary of Production | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | Productive | | Departmental Charges | | |
| | Actual | Productive | Non-Productive | | Hrs. | Wages | Hrs. | @ | Amount |
| | £ s d | £ s d | £ s d | | | £ s d | | | £ s d |
| Total .. £ | | | | | | | | | |

## TRADING ACCOUNT.

| *Dr.* | £ | s | d |
|---|---|---|---|
| SECTION I. | | | |
| To Stock on hand— | | | |
| Work in Progress .. .. .. .. .. .. | 6,000 | 0 | 0 |
| Manufactured Stock .. .. .. .. .. .. | 2,500 | 0 | 0 |
| | £8,500 | 0 | 0 |
| SECTION II. | | | |
| To Balance brought down .. .. .. .. .. | 750 | 0 | 0 |
| ,, Raw Materials Consumed .. .. .. .. | 6,400 | 0 | 0 |
| ,, Wages .. .. .. .. .. .. .. .. | 8,900 | 0 | 0 |
| ,, Outwork .. .. .. .. .. .. .. .. | 1,000 | 0 | 0 |
| ,, Carriage .. .. .. .. .. .. .. .. | 500 | 0 | 0 |
| ,, Rent, Rates, Taxes, normal Lighting and Heating | 550 | 0 | 0 |
| ,, Plant and Machinery, R. and A. .. .. .. | 200 | 0 | 0 |
| ,, ,, ,, Insurance .. .. .. | 150 | 0 | 0 |
| ,, ,, ,, Depreciation.. .. .. | 400 | 0 | 0 |
| ,, Motive Power Purchases .. .. .. .. | 250 | 0 | 0 |
| ,, Travellers' Salaries and Expenses .. .. .. | 750 | 0 | 0 |
| ,, Commission on Sales .. .. .. .. .. | 200 | 0 | 0 |
| ,, Incidental Expenses .. .. .. .. .. | 400 | 0 | 0 |
| ,, Depreciation of Stocks .. .. .. .. | 500 | 0 | 0 |
| ,, Insurance .. .. .. .. .. .. | 100 | 0 | 0 |
| ,, Directors' Remuneration .. .. .. .. | 500 | 0 | 0 |
| ,, Bad Debts .. .. .. .. .. .. .. | 50 | 0 | 0 |
| ,, Discounts on Sales .. .. .. .. .. | 400 | 0 | 0 |
| ,, Profit .. .. .. .. .. .. .. .. | 1,500 | 0 | 0 |
| | £23,500 | 0 | 0 |

| *Cr.* | £ | s | d |
|---|---|---|---|
| By Stock on hand— | | | |
| Work in Progress .. .. .. .. .. .. | 5,000 | 0 | 0 |
| Manufactured Stock .. .. .. .. .. .. | 2,750 | 0 | 0 |
| Balance, carried down .. .. .. .. .. .. | 750 | 0 | 0 |
| | £8,500 | 0 | 0 |
| By Discount on Purchases .. .. .. .. .. .. | 400 | 0 | 0 |
| ,, Sales .. .. .. .. .. .. .. .. .. | 23,100 | 0 | 0 |
| | £23,500 | 0 | 0 |

Many items which are stated separately in the ordinary Trading Account are grouped together here.

This Account includes items which sometimes go direct to the Profit and Loss Account. It is split into sections in order to get all Expenses of Production and Selling into one account, Section II.

## ANALYSIS OF EXPENSES. ASCERTAINING DEPARTMENTAL COST.

| Item | Nature of Expenditure | Total | Artists | | Transfer | | Litho Machine | | Comp. | | L'press Machine | | Bindery | | Stores | | Manufactured Stock | | Outwork | | Carriage | General Charges | | Stone Polish | Motive Power |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | P. | Ex. | P. | Ex. | P. | Ex | P. | Ex. | P. | Ex. | P. | Ex. | P. | Ex. | P. | Ex. | P. | Ex. | | Mfg | Slg | | |
| | | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ |
| 1 | Productive Wages.. .. .. .. | 5400 | 1000 | .. | 700 | .. | 1000 | .. | 500 | .. | 1000 | .. | 1200 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | | |
| 2 | Non-Productive Wages .. .. .. | 3500 | .. | 100 | .. | 200 | .. | 500 | .. | 350 | .. | 400 | .. | 200 | .. | 250 | .. | 50 | .. | .. | .. | 1000 | 100 | 200 | 150 |
| 3 | Productive Material .. .. .. | 6000 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 6000 | .. | .. | .. | .. | .. | .. | .. | .. | | |
| 4 | Non-Productive Material .. .. | 400 | .. | 20 | .. | 60 | .. | 90 | .. | 10 | .. | 90 | .. | 50 | .. | 10 | .. | .. | .. | .. | .. | 60 | .. | 10 | |
| 5 | Outwork .. .. .. .. .. | 1000 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 1000 | .. | .. | .. | .. | | |
| 6 | Carriage .. .. .. .. .. | 500 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 480 | 20 | .. | | |
| 7 | Rent, Rates, Taxes, Light and Heat .. | 550 | .. | 30 | .. | 40 | .. | 70 | .. | 40 | .. | 80 | .. | 100 | .. | 50 | .. | 20 | .. | .. | .. | 80 | 10 | 20 | 10 |
| 8 | Plant and Machinery, R. and A. .. | 200 | .. | 20 | .. | 30 | .. | 50 | .. | 20 | .. | 50 | .. | 30 | .. | .. | .. | .. | .. | .. | .. | .. | .. | | |
| 9 | " " Insurance .. | 150 | .. | 5 | .. | 5 | .. | 35 | .. | 25 | .. | 35 | .. | 15 | .. | 10 | .. | 5 | .. | .. | .. | .. | .. | 5 | 10 |
| 10 | " " Depreciation .. | 400 | .. | 5 | .. | 10 | .. | 100 | .. | 100 | .. | 100 | .. | 70 | .. | 5 | .. | .. | .. | .. | .. | .. | .. | .. | 10 |
| 11 | Motive Power Purchases .. .. | 250 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 250 |
| 12 | Travellers' Salaries and Expenses .. | 750 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 750 | | |
| 13 | Commission on Sales .. .. .. | 200 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 200 | | |
| 14 | Incidental Expenses .. .. .. | 400 | .. | 10 | .. | 10 | .. | 20 | .. | .. | | 10 | .. | 10 | .. | .. | .. | .. | .. | .. | .. | 300 | 40 | | |
| 15 | Depreciation of Stocks .. .. .. | 500 | .. | . | .. | .. | | .. | .. | .. | .. | .. | .. | .. | .. | 250 | .. | 250 | | | | | | | |
| 16 | Insurance " .. .. .. | 100 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 60 | .. | 40 | | | | | | | |
| 17 | Directors' Remuneration .. .. | 500 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 500 | | | |
| 18 | Bad Debts .. .. . .. .. | 50 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 50 | | |
| 19 | Discount on Sales.. .. .. .. | 400 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 400 | | |
| 20 | Agreeing with Trading Account * .. | 21250 | 1000 | 190 | 700 | 355 | 1000 | 865 | 500 | 545 | 1000 | 765 | 1200 | 475 | 6000 | 635 | .. | 365 | 1000 | .. | 480 | 1960 | 1550 | 235 | 430 |
| 21 | Rejected Sketches .. .. .. | 500 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 500 | | |
| 22 | Work for Self .. .. .. .. | 200 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 150 | 50 | | |
| 23 | Motive Power .. .. .. £430 | .. | | .. | .. | 60 | .. | 150 | .. | .. | .. | 150 | .. | 70 | | | | | | | | | | | |
| 24 | Stone Polishing .. .. .. £235 | .. | .. | .. | .. | 235 | | | | | | | | | | | | | | | | | | | |
| 25 | Manufactured Stock Issued .. .. | 600 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 600 | | | | | | | | |
| 26 | Expenses of Manufactured Stock £365 | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | .. | 365 | | |
| 27 | TOTAL COST .. £ | 22550 | 1000 | 190 | 700 | 650 | 1000 | 1015 | 500 | 545 | 1000 | 915 | 1200 | 545 | 6000 | 635 | 600 | .. | 1000 | .. | 480 | 2110 | 2465 | | |

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* If the Opening Stocks of Work in Progress exceed the Closing Stocks, the difference is a debit to Trading, *neither this difference*, nor *Profit on Trading* are Expenses to be treated above but they are shown in the Summary of the Analysis of Expenses. Page 49.

As Selling Expenses are dependent upon the Sale Price of the Goods they should be calculated as a percentage on that figure.

We obtain this from the weekly totals in the Wages Book (p. 30), and at the same time make up a Summary of Production, which we require and will refer to later.

The Summary of the Wages Analysis is obtained on the form given on page 39.

We will now proceed to discuss the basic principles of analysing expenses, apply them, and so arrive at the cost of running each department.

We take the Trading Account for the period, and also a sheet ruled to take all the necessary departments, and proceed to analyse the expenses over the departments, according to each department's consumption of those expenses.

## PURCHASES DAY BOOK.

| Date | Invoice No. | Bought of | Quantity | Description | Discount | Ledger Folio | Purchase | Returns and Allowances | Allocation |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | £ s d | £ s d | |

Items 1 and 2. Productive and Non-productive Wages are ascertained from the wages analysis. Often in analysing expenses it is forgotten that many hours of the productive workers are engaged upon non-productive work, and the total wages paid placed in the Productive column. By this method some portion of the productive wages is not calculated in the costs of individual jobs, and the result is a loss of profit equal to the amount of wages and expenses unrecovered, because the total cost of jobs is understated. If, however, we make this mistake in Analysing Expenses, we show a greater productive, and consequently a lesser non-productive charge, the result being that we are doubly losing, for we should be reckoning a much lower percentage or hour rate for expenses than would be actually incurred.

## ANALYSIS OF PURCHASES.

| A. | B. | 5 | 6 | 7 | 8 | 9 | 11 | 12 | 13 | 14 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Capital Expenditure | Stores | Outwork | Carriage | Rent, Rates, Taxes, Light, and Heat | Plant and Machinery R. & A. | Plant and Machinery Insurance | Motive Power | Travellers' Salaries and Expenses | Commission on Sales | Incidental Expenses | Insurance of Stocks |

The No. over each column represents the item in the Analysis of Expenses—Page 41.
Items A and B do not affect the Cost Accounts (page 34).

The Productive Wages in the Wages Analysis is the actual amount debited to jobs, therefore this is the item to go into the Productive column of the Analysis of Expenses.

Productive wages have already been defined as a necessary operation of normal production (see p. 24). Waiting, and other abnormal items are clearly non-productive, and are treated as such in the Analysis of Wages.

Items 3 and 4. Material Consumed is taken from the Material Issued and Returned Records, the summary of which is given on p. 38. There will probably be a slight difference in the booking out of materials owing to fractional parts of a penny being taken as a penny in the calculations, but this must be adjusted before transferring the figures to the Analysis of Expenses.

Productive Material is the amount of the Productive column of the Material Issued Records actually debited to Cost Tickets. Non-productive Material is the total of the Non-productive columns, issued for departmental consumption, not on any given job, but for general use. It is not chargeable in definite quantities to definite orders, and so must be recovered in the expenses (p. 38).

We have now dealt with the two great items of Wages and Materials, but before we can proceed we must have an Analysis of the Purchases Day Book, which will be found on the preceding page.

Item 5. Outwork is a direct purchase for a job. It is a productive item chargeable to the cost of that job.

Item 6. Carriage outwards on goods delivered is a necessary cost, and a definite charge to the job. Carriage on parcels chargeable to office must go as a general charge.

Item 7. Rent, Rates, Taxes, normal Lighting and Heating, must be allocated according to the area of the various departments.

Item 8. Plant and Machinery Repairs, Renewals and Alterations are to be charged to the departments incurring the expense.

Item 9. Plant and Machinery Insurance is based upon capital values and allocated accordingly.

Item 10. Plant and Machinery Depreciation is the actual figure incurred by each department taken from the Depreciation Records. These should be kept in book form. The book should be departmentalised, and each machine given a certain length of life. If this is done, when the number of years' life is exhausted, the machine will have paid back its purchase price, and can be replaced, thus keeping an up-to-date and efficient plant without calling in fresh capital. If a machine is given a life of 10 years, one-tenth of the purchase price will be written off annually.

Item 11. Motive Power. Purchases for this consist of Coal, Water, &c. They are carried to the Motive Power column in order to ascertain the total cost of motive power before dividing that cost over the departments consuming same.

Items 12 and 13. Travellers' Salaries, Expenses, and Commission on Sales are purely selling expenses, and go into the General Charges, Selling column.

Item 14. Incidental Expenses. Each invoice should be marked indicating the department to which it is chargeable, and an analysis made giving the figure to charge to each.

Item 15. Depreciation of Stocks and Stores is to be charged against the respective stores.

Item 16. Insurance of Stocks and Stores should be treated similarly, each bearing its proper proportion.

Item 17. Director's Remuneration. The managing director's time is principally occupied in supervising manufacturing, therefore this expense should go into the General Charges, Manufacturing column. If a portion of his time is taken up travelling or managing the selling side of the business, a proportion should be put into the General Charges, Selling column.

Item 18. Bad Debts are a selling expense.

Item 19. Discounts on Sales. This is a selling expense. Some writers think that this should be deducted from the sale price of goods, but if you do this, and render all invoices net, the customer will probably knock another 2½ per cent. off when sending his cheque. It is, therefore, advisable to treat as an expense all ordinary discounts. In special cases, such as high Trade discounts, these should be taken separately, and allowed for when fixing your selling price. Then the amount of these special discounts could be deducted from the sale price, and would not enter into the Expenses.

Item 20 shows the agreement with the Trading Account. There are, however, two items on the debit side of the Trading Account which we have not dealt with, £750 difference in stocks and £1,500 profit. Neither of these are expenses of production, therefore they must not be treated here. They are shown on the Summary of the Analysis of Expenses on p. 49.

But we have not finished. There are other expenses of production which do not appear in the Trading Account, and which are a frequent source of blunder when analysing expenses, or when calculating the percentage of expenses to productive wages.

These are Rejected Sketches, and Work for Self. They are regarded as productive in the Costs, and if you do not recover them in your expenses your profit shown on jobs will be overstated by that figure.

Item 21. Rejected Sketches are a very heavy item, and are responsible for many firms' losses. It is unfortunate that this item is out of sight, and never comes to light in the Financial Accounts.

It is a Selling Expense, and must be recovered in the General Charges, Selling column.

Item 22. Work for Self. This also is seldom covered in the costs, for, like rejected sketches, it is seldom shown in the Financial Accounts. It is mainly a manufacturing expense, but partly a selling charge. It requires dividing according to the nature of the work done, whether it is consumed by the manufacturing or the selling side of the business.

Item 23. Motive Power has up to the present been treated as a separate department. Now we know its total cost we can divide it over the departments according to the amount required to drive each.

Item 24. Stone Polishing. This, too, up to the present, has been treated as a separate department. If we could find a satisfactory basis of charging this to the various orders we could treat it productively, but stones are polished at all times, and it is almost impossible to get correct records of stones polished for each job.

Under the circumstances I prefer to regard it in the same manner as the distribution of type, and as the Transfer Department consumes the stones, treat it as an expense of that department.

Item 25. Manufactured Stock issued is ascertained from the Manufactured Stock Issued Records in the same manner as material is dealt with (p. 37).

Item 26. Expenses of Manufactured Stock. This consists principally of Depreciation, and it is difficult to define how it shall be recovered. Certainly it ought not to be charged as an expense of Manufactured Stock issued, because the stagnant stocks incur the greater expense, the cost of handling the moving stock being very small. Customers will not pay any interest on the capital locked up, even though by ordering a larger quantity they obtain the goods at a cheaper price. However, as it is obviously unfair to calculate these expenses as a percentage on Manufactured Stock issued, we have no alternative, and must place these expenses in the General Charges, Selling column.

Item 27. Total Cost. We have now divided the total expenses of the concern over the departments, and ascertained the cost of each, the percentage of departmental charges to be added to productive wages, giving Process Cost. The percentage of General Charges, Manufacturing, to Process Cost, which, with Productive Material, plus the Material Departmental Expenses, gives the Total Manufacturing Cost. We also know the amount to be calculated on the Total Sales to recover our General Charges, Selling.

We have now to discover how to recover these expenses on the various articles produced.

## SUMMARY OF THE ANALYSIS OF EXPENSES.

| Department | Process Cost | | Percentage to Productive |
|---|---|---|---|
| | Productive | Departmental Charges | |
| | £ s d | £ s d | |
| Artists .. .. .. .. .. | 1,000 0 0 | 190 0 0 | 19% |
| Transfer .. .. .. .. | 700 0 0 | 650 0 0 | 93% |
| Litho Machine .. .. .. .. | 1,000 0 0 | 1,015 0 0 | 101% |
| Composition .. .. .. .. | 500 0 0 | 545 0 0 | 109% |
| Letterpress Machine .. .. | 1,000 0 0 | 915 0 0 | 91% |
| Bindery .. .. .. .. .. | 1,200 0 0 | 545 0 0 | 45% |
| Total .. .. .. .. | £5,400 0 0 | £3,860 0 0 | |
| Material Consumed .. .. .. | 6,000 0 0 | 635 0 0 | 10% |
| Cr. Manufactured Stock .. .. | 600 0 0 | .. | .. |
| Outwork .. .. .. .. | 1,000 0 0 | .. | .. |
| Carriage .. .. .. .. .. | 480 0 0 | .. | .. |

### FINAL SUMMARY.

| | £ s d | £ s d | |
|---|---|---|---|
| Productive Wages .. .. .. | 5,400 0 0 | | |
| Departmental Charges .. .. | 3,860 0 0 | | |
| = Process Cost .. .. | | 9,260 0 0 | |
| General Charges Manufacturing .. (= 23% of Process Cost) | | 2,110 0 0 | |
| Productive Material .. .. .. | 6,000 0 0 | | |
| Material, Departmental Charges .. | 635 0 0 | | |
| Total Material and D.C. .. | | 6,635 0 0 | |
| Outwork .. .. .. .. | | 1,000 0 0 | |
| Total Manufacturing Cost .. | | 19,005 0 0 | |
| Cr. Manufactured Stock* .. .. | | 600 0 0 | |
| Carriage .. .. .. .. | | 480 0 0 | |
| General Charges, Selling .. .. (= 10⅔% of Sales) | | 2,465 0 0 | |
| Total agreeing with Analysis of Expenses .. .. .. | | 22,550 0 0 | |
| Cr. Work in Progress* .. .. | | 1,000 0 0 | |
| Total Cost .. .. .. | | 23.550 0 0 | A |
| Manufacturing Profit† .. .. | | 1,100 0 0 | |
| ,, Loss .. .. .. | | 0 0 0 | |
| Charge to Customer .. .. .. | | 23,100 0 0 | B |
| ,, Manufactured Stock* .. | | 850 0 0 | |
| ,, Rejected Sketches Account | | 500 0 0 | |
| ,, Work for Self Account .. | | 200 0 0 | |
| Total Charge .. .. | | £24,650 0 0 | |

NOTES.

A. B. These agree.

* This is the difference in stocks as shown in the Trading Account, viz. :—

| | | |
|---|---|---|
| Manufactured Stock .. .. | *Dr.* | £850 |
| ,, ,, .. .. | *Cr.* | £600 |
| Increase in Manufactured Stock | | £250 |
| Decrease in Work in Progress .. | | £1,000 |
| Difference in Stocks .. .. .. | | £750 |

*See* Section 1. Trading Account (Page 40).

| | £ s d |
|---|---|
| †Manufacturing Profit .. .. .. .. .. | 1,100 0 0 |
| Incidental Profit, Discount on Purchases.. .. .. | 400 0 0 |
| Profit, agreeing with Trading Account .. .. .. | £1,500 0 0 |

## CHAPTER VII.

# RECOVERING WORKING EXPENSES.

## FIXING THE HOUR RATES.

On the preceding page is given the Summary of the Analysis of Expenses. This shows the cost of each Department, and the agreement with the Trading Account in the same form as we shall calculate the Costs of individual jobs, and also in the same manner as we make up the Summary of Production, which is obtained from the final figures of the Wages Analysis (p. 39), and of Stores Consumed (p. 38), and which is printed on p. 52.

Having ascertained the cost of each department, the question now arises: What is the correct method of recovering these expenses on the individual orders?

Is it to be done by means of a percentage or as a rate per hour to be added to the productive wages? In my opinion a rate per hour is the correct way of recovering the departmental charges in those departments where wages vary, and where time rates are in operation.

Take the Artists' Department as an illustration. Here the wages fluctuate exceedingly. One man may be paid 10d. per hour, and another 1s. 8d. The Departmental Expenses are 19% of the Productive Wages, therefore the percentage basis would give you 1s. and 2s per hour respectively as Process Cost, and you would be recovering 2d. and 4d. per hour respectively for departmental charges.

In a department where the Departmental Expenses are higher, the difference will be even more marked.

In this department the rate for expenses works out at 3d., which, added to the productive wages, gives you 1s. 1d. and 1s. 11d., instead of 1s. and 2s. per hour under the percentage method, therefore the rate per hour is the most correct method.

In the Machine Department a rate per hour should be fixed for each machine. If there is only one class of machine, the actual number of productive hours, divided into the Departmental Charges, gives you the rate per hour to add to productive wages to obtain Process Cost.

If the classes and sizes of machines vary, it is necessary to analyse further the departmental charges, treating each class of machine as a separate department, and then, by dividing the actual productive hours worked by each class of machine into the departmental expenses of each class of machine, ascertain the hour rate to be added to Productive Wages to obtain Process Cost.

In the Bindery it is impossible to give an hour rate for departmental charges, because often, and more often than not, the employees are paid at piece rates.

Here the percentage method is perfectly correct, as it simply increases the cost *pro rata* per unit of production.

On Raw Materials issued we have no alternative. We must calculate the departmental charges as a percentage on the value of the materials consumed. The average value of materials consumed under normal conditions will only vary very slightly, and in all probability the expenses of handling the stock will fluctuate accordingly.

Are General Charges, Manufacturing, to be recovered in the hour rate, or as a percentage on the total departmental—i.e. process cost?

## FINAL SUMMARY OF WORKS PRODUCTION.

| Department | Productive | | Departmental Charges | | |
|---|---|---|---|---|---|
| | Hours | Wages | Hours | @ | Amount |
| | | £ s d | | | £ s d |
| Artists .. .. .. | 15,000 | 1,000 0 0 | 15,000 | 3d. | 187 0 0 |
| Transfer .. .. .. | 19,000 | 700 0 0 | 19,000 | 8d. | 633 0 0 |
| Litho Machine .. .. | 22,000 | 1,000 0 0 | 8,000 | 1/- | 400 0 0 |
| ,, .. .. | .. | .. | 10,000 | 10½d. | 427 0 0 |
| ,, .. .. | .. | .. | 4,000 | 8d. | 133 0 0 |
| Composing .. .. .. | 15,000 | 500 0 0 | 15,000 | 8d. | 500 0 0 |
| Letterpress Machine .. | 23,000 | 1,000 0 0 | 8,000 | 1/- | 400 0 0 |
| ,, .. | .. | .. | 12,000 | 10d. | 500 0 0 |
| ,, .. | .. | .. | 3,000 | 4d. | 50 0 0 |
| Bindery .. .. .. | .. | 1,200 0 0 | .. | 40% | 480 0 0 |
| Total .. | .. | £5,400 0 0 | .. | .. | £3,710 0 0 |
| Material Consumed .. | .. | 6,000 0 0 | 10% | | 600 0 0 |
| Outwork .. .. .. | .. | 1,000 0 0 | .. | | .. |
| Manufactured Stock Cr. .. | .. | 600 0 9 | .. | | .. |
| Carriage .. .. .. | .. | 480 0 0 | .. | | .. |

SUMMARY.

| | | |
|---|---|---|
| | £ s d | £ s d |
| Productive Wages .. .. .. | 5,400 0 0 | |
| Departmental Charges .. .. | 3,710 0 0 | |
| Total Process Cost .. .. | .. | 9,110 0 0 |
| General Charges, Manufacturing 25% | .. | 2,277 0 0 |
| Productive Material .. .. .. | 6,000 0 0 | |
| Material Department Charges .. | 600 0 0 | |
| Total Material and D.C. .. | .. | 6,600 0 0 |
| Outwork .. .. .. .. | .. | 1,000 0 0 |
| Total Manufacturing Cost .. | .. | 18,987 0 0 |
| Manufactured Stock Cr. .. .. | .. | 600 0 0 |
| Carriage .. .. .. .. | .. | 480 0 0 |
| *General Charges, Selling 10% on Sale Price .. .. .. .. | .. | 2,310 0 0 |
| Total Production .. .. | .. | £22,377 0 0 |

The Calculations on this Form are made to the nearest £

| | |
|---|---|
| *Total Sales .. .. | £23,100 0 0 |
| 10% Selling Expenses | 2,310 0 0 |

The management buys each department's production at its process cost. Does a middleman ascertain the amount of Labour in an article before he calculates his percentage for Expenses? There may be a department working at 20% departmental charges, and another at 100%. Are both to bear the same amount for general manufacturing charges? I think not. Certainly the department with the heavy expenditure will consume more of the general management expenses than the cheaper department.

The only correct basis, in my opinion, is to recover the General Charges, Manufacturing, over the producing departments, according to the value of the work they produce, i.e. as a percentage on the Process Cost.

General Charges, Selling, are to be recovered as a percentage on the Sale Price—Selling Expenses are incurred, whether dealing in Labour or in Materials, and should, in costing, be calculated on the Total Sales. In estimating the equivalent percentage on total, manufacturing cost could be added.

You know that the rates you have ascertained are correct, that you have covered every item of your costs, and that if you use those rates in your Estimating and your Costing, your profit will materialise, and you will be able to swear by your price.

By means of the Final Summary of Works production, you can see what each department has earned, for we are debiting each department with its expenses and crediting it with the productive wages and departmental charges or Process cost which it has charged to Cost Tickets.

This final Summary of Works Production is the total Credits to all departments, and the total debit to Work in Progress.

Work in Progress consists of many thousands of individual jobs, differing in many respects from each other. We have to ascertain the cost of each one of these jobs separately, and so, in the following chapter, we shall see how the cost of these individual jobs is ascertained.

## CHAPTER VIII.

## ASCERTAINING JOB COST.

In ascertaining Job Cost, the first essential is to record all orders when received in an Order Book as below :—

**ORDERS RECEIVED BOOK.** ......................191..

| Date | Traveller | Order No. | Customer | Qu'ntity Order'd | Description | Size | Print-ings | Price | Est. No. |
|---|---|---|---|---|---|---|---|---|---|
| | | 1 | | | | | | | |
| | | 2 | | | | | | | |
| | | 3 | | | | | | | |
| | | 4 | | | | | | | |
| | | 5 | | | | | | | |
| | | 6 | | | | | | | |
| | | 7 | | | | | | | |
| | | 8 | | | | | | | |
| | | 9 | | | | | | | |
| | | 10 | | | | | | | |

The index to the Orders Received Book will be kept on the loose-leaf system, one sheet being used for each customer.

**INDEX TO ORDERS RECEIVED BOOK.**

Customer..............................
Address..........................................
Traveller

| Date | Order No. | Quantity | Description | Price | Cost | Price | Charge | Remarks |
|---|---|---|---|---|---|---|---|---|
| | | | | | £ s d | | £ s d | |

A separate Sheet should be used for each Customer and the Card Index or Loose-leaf System of Binding adopted.

The next thing is to issue a Work Ticket, containing all the particulars necessary to carry the job through without a hitch.

Date January 1st 1919. **WORK TICKET.** (*Front.*) *No.* 316.

*Customer* JOHN JONES, Manchester.

*Description of Job* 500 Demy 8vo Booklets.

f on Cost ..
Est. No. 1,048 ..
Est. Price ..
Prev. Order No.
Prev. Price ..

32 pages inside, set in Long Primer Solid. 24 ems wide. 42 ems deep.
4 page Cover, 1st page only printed. 10 lines display matter.
Wire Stitched. Two Wires through back.

*Size of Job* Demy 8vo. *No. of Printings (Inside)* Black
„ *Sheet* *No. on* „ „ *(Cover)* Black

Customer's Order No. 395

*Quality of Paper to be used (Insides)* 48lbs. D. Demy at 8/- Ream.
„ „ „ *(Cover)* Demy at 10/- „

*Traveller* Brown.

| Issued by | Passed by |
|---|---|
| A. R. | J. L. S. |

*Estimated to work* 2 formes 16's. Cover on Platen.
*Previously worked*

Proof Wanted
To be sent to

Goods Wanted
To be sent to

**Special Proof Instructions.**

**Special Working Instructions.**

| Sketches | First | Second | | Proofs | First | Second | | | |
|---|---|---|---|---|---|---|---|---|---|
| Date Sent .. | | | | Date Sent | 9/1 | | | | |
| Date Returned | | | | Date Retd. | 10/1 | | | | |
| Progress of Job | Litho Artist | Proving and Transfer | Litho Machine | Compositor | Letterpress | Binding | Making-up | Mounting and Varnishing | Packing |
| Date Received | | | | 3/1 | 12/1 | | 13/1 | | 15/1 |
| Date Passed on | | | | 11/1 | 13/1 | | 15/1 | | 16/1 |

**Standing Orders.**—All Particulars on this Sheet must be clearly and distinctly worded. No person is to alter these Instructions except the Order Clerk. All Materials issued to this Order are to be recorded on the Back of this Sheet, and all Returns of Material entered when returned to STOCK. In addition to recording the MATERIALS ISSUED AND RETURNED on this Ticket, they must be entered in the Books provided for that purpose. Workmen must check all material issued to them with the particulars entered on the back of this ticket, and immediately report any error to the Storekeeper. No work to be proceeded with unless accompanied by a Work Ticket, and FOREMEN are held responsible that all particulars are entered before passing the Ticket on to another DEPARTMENT

**WORK TICKET**—*Back.* MATERIALS CONSUMED ON ORDER.

ISSUED FROM PAPER STORES.

| Date | Sheets | Weight | Size | Description | Stock No. | Price | Per | Issued by |
|---|---|---|---|---|---|---|---|---|
| 12/1/19 | 528 | 48 | D.D. | Plain | 3154 | 8/- | Ream | A. K. |
| 12/1/19 | 128 | — | D. | Cover | 1718 | 10/- | „ | A. K. |
| Returned to Stores | | | | | | | | |

ISSUED FROM INK STORES

| Date | Colour of Ink | M.I.B. Disposal Folio | Weight | Price | Per | Issued by |
|---|---|---|---|---|---|---|
| | | | lbs. oz. | | | |
| 12/1/19 | Black | 178 | 8 | 2/- | lb. | B. L. |
| Returned to Stores | | | | | | |

ISSUED FROM BINDERY STORES

| Date | Pieces | No. out | Yards | Description | Price | Per | Issued by |
|---|---|---|---|---|---|---|---|
| 15/1/19 | | | 30 | Wire=¼ lb. | 4d. | lb. | J. M. |

ISSUED FROM........................STORES

| Date | Description | Price | Per | Issued by |
|---|---|---|---|---|
| | | | | |

DELIVERY AND CARRIAGE RECORD.

| Instructions for Delivery | Date | Quantity sent in | To | Per | No of Parcels | Weight Cwts. | Weight qrs. | Weight lbs. |
|---|---|---|---|---|---|---|---|---|
| | 15/1/19 | 500 | J. Jones | Boy | | | | |

## COST TICKET. (*Front.*)

*No.* 316.

*Date* January 1st 1919.
*Customer* John Jones, Manchester.
*Description of Job* 500 Demy 8vo Booklets.

| | |
|---|---|
| If on Cost .. <br> Est. No. 1,048 .. <br> Est. Price £10 lot <br> Prev. Order No... <br> Prev. Price .. | 32 pages inside, set in Long Primer Solid. 24 ems wide. 42 ems deep. <br> 4 page Cover, 1st page only printed. 10 lines display matter. <br> Wire Stitched. Two Wires through Back. |
| Customer's Order No. 395. | *Size of Job* Demy 8vo. <br> ,, *Sheet* *No. on* <br> *No. of Printings (Inside)* Black <br> ,, ,, *(Cover)* Black |
| *Traveller* Brown. | *Quality of Paper to be used (Insides)* 48lbs. D. Demy at 8/- Ream. <br> ,, ,, ,, *(Cover)* Demy at 10/- ,, |
| Issued by: A. R. <br> Passed by: J. L. S. | *Estimated to work* 2 formes 16's. Cover on Platen. <br> *Previously worked* |

| **Labour** | Total | At | Productive Wages | Total | At | D. C. |
|---|---|---|---|---|---|---|
| | | | £ s d | | | £ s d |
| Design .. .. .. | | | | | | |
| Litho .. .. .. | | | | | | |
| Proving .. .. .. | | | | | | |
| Transfer .. .. .. | | | | | | |
| Litho. Machine—Rotary | | | | | | |
| ,, ,, Flatbed | | | | | | |
| Bronzing .. .. .. | | | | | | |
| Composition .. .. | 76 | .. | 2 10 6 | 76 | 8 | 2 10 8 |
| Mono .. .. .. | | | | | | |
| Electro & Stereo. .. | | | | | | |
| L. P. Cylinder .. .. | 6 | 8 | 0 4 0 | 6 | 1/- | 0 6 0 |
| ,, Platen .. .. | 1½ | 3 | 0 0 5 | 1½ | 4 | 0 0 6 |
| Ruling .. .. .. | | | | | | |
| Binding and Blocking.. | | | | | | |
| Making Up—Gen. .. | | | 0 2 0 | .. | 40% | 0 0 10 |
| Cutting .. .. .. | 1½ | 6 | 0 0 9 | 1½ | 6 | 0 0 9 |
| Total Labour | | | £2 17 8 | | | £2 18 9 |

| **Material** | | Productive Material | | D. C. |
|---|---|---|---|---|
| | | £ s d | | £ s d |
| Paper Stores .. .. | | 0 11 6 | 10% | 0 1 2 |
| Ink ,, .. .. | | 0 1 0 | | 0 0 1 |
| Bindery ,, .. .. | | 0 0 1 | | |
| Total Material .. | | £0 12 7 | | £0 1 3 |

### SUMMARY.

| | £ s d | £ s d |
|---|---|---|
| Prod. Wages .. .. | 2 17 8 | |
| D.C. .. .. | 2 18 9 | |
| Process Cost .. | | 5 16 5 |
| G.C. Manufacturing 25% | | 1 9 1 |
| Prod. Material .. | 0 12 7 | |
| Material D.C. .. | 0 1 3 | |
| Total Material Cost | | 0 13 10 |
| Outwork .. .. | | |
| Total Manufacturing Cost | | 7 19 4 |
| Manufactured Stock Cr. | | |
| Carriage .. .. .. | | |
| G.C. Selling 10% on Sale Price .. .. .. | | 1 0 0 |
| Total Cost | | 8 19 4 |
| Profit .. | | 1 0 8 |
| Loss .. | | |
| Charge to Customer .. | | 10 0 0 |
| ,, Stock .. .. | | |
| ,, Nominal a/cs... | | |
| Total Charge .. | | £10 0 0 |

Cost Price 35/10 per 100
Sale Price 40/- per 100
Stock Price per

### Delivery, Carriage and Sales Record.

| Date | Quantity | Folio | Carriage | D.B. Folio | Price | Charge |
|---|---|---|---|---|---|---|
| | | | £ s d | | | £ s d |
| 15/1/19 | 500 | 318 | .. | 459 | | 10 0 0 |

| Calculated by | Checked by | C. & S. S. Entry by | C. & S. S. Folio |
|---|---|---|---|
| W. M. | T. J. | H. L. | 35 |

*See over*

## COST TICKET. (*Back.*)

| Process: Date | Process | Employee | Labour Cost:— Details of Time | Total | At | Productive Wages |
|---|---|---|---|---|---|---|
| | | | | | | £ s d |
| 3/1/19 | Comp. .. | Jones .. | 3 9 8 7 5 | 32 | 8 | 1 1 4 |
| 4/1/19 | ,, .. | Smith .. | 8 4 ½ 9 9 ½ 3 | 34 | 8 | 1 2 8 |
| 4/1/19 | ,, .. | Wright | 1 ½ | 1½ | 7½ | 0 0 11 |
| 9/1/19 | Pfs. .. | Taylor.. | 1 ½ ¾ | 2¼ | 7½ | 0 1 5 |
| 12/1/19 | Imp. .. | Jones .. | 3 | 3 | 8 | 0 2 0 |
| ,, | ,, .. | Wright | ½ | ½ | 7½ | 0 0 2 |
| ,, | ,, .. | Smith .. | 3 | 3 | 8 | 0 2 0 |
| | | | | 76 | | £2 10 6 |
| 12/1/19 | No. 3 Machine .. | Brown.. | 2 ¾ 3 ¼ | 6 | 8 | £0 4 0 |
| 12/1/19 | Platen .. | Rowe .. | 1 ½ | 1½ | 3 | £0 0 5 |
| 13/1/19 | Folding .. | Lee . | 3 ¼ | 3¼ | 3 | £0 0 10 |
| 13/1/19 | Gathering | Lee .. | 1 | 1 | 3 | 0 0 3 |
| 14/1/19 | Wire stitch | Gill .. | 1 ½ | 1½ | 4 | 0 0 6 |
| ,, | Making up | Ford .. | 1 1 | 2 | 2½ | 0 0 5 |
| | | | | 7¾ | | £0 2 0 |
| 15/1/19 | Cutting .. | Sim .. | 1 ½ | 1½ | 6 | £0 0 9 |

### MATERIALS CONSUMED.

#### Issued from Paper Stores

| Date | Sheets | Weight | Size | Description | Price | |
|---|---|---|---|---|---|---|
| | | | | | | £ s d |
| 12/1/19 | 528 | 48 | D.D. | Plain | 8/- Rm. | 0 8 10 |
| 12/1/19 | 128 | | D. | Cover | 10/- ,, | 0 2 8 |
| | | | | | | 0 11 6 |

#### Issued from Ink Stores

| Date | Colour | M.I.B. Fo. | lbs. oz. | Price | |
|---|---|---|---|---|---|
| | | | | | £ s d |
| 12/1/19 | Black | 178 | 8 | 2/0 | 0 1 [illegible] |

#### Issued from Bindery Stores

| Date | Description | Qty. | Price | |
|---|---|---|---|---|
| | | | | £ s d |
| 15/1/19 | Wire | ¼ lb. | 4 | 0 0 1 |

*See over.*

A Cost Ticket is issued at the same time, being a carbon copy of the particulars of order contained on the Work Ticket. Only one Work Ticket and one Cost Ticket is issued for each job, and as these bear the same number, one job is worked to one order number.

The Cost Ticket goes to the Cost Clerk, but the Work Ticket, with the copy attached, or if an envelope is used as the Work Ticket the copy is inside, accompanies the job on its way through the works.

The storekeeper issues all the material required on the production of the Work Ticket, and enters the material issued on the back of the Work Ticket, in addition to recording it in the Material Issued Books (pp. 34, 35) provided for that purpose. Any material returned is treated in the same manner, the quantity being marked off the Work Ticket and entered in the Material Returned Book.

The original entry in the Material Issued and Returned Books is sent down to the Cost Office at the close of the day, where the material is calculated and posted to the Cost Ticket of the job concerned.

The Time Sheets (pp. 25, 27, 28) recording all work done also come to the Cost Office each day, and all Productive items are entered to the Cost Tickets after the Analysis of Wages has been made.

Deliveries and Carriage are entered from the Delivery and Carriage Record Book, in which is recorded everything sent off the premises.

This record provides a valuable check upon the Carriers' Accounts. It is kept in duplicate in the same manner as the Material Issued Books, the original entry being sent daily to the Cost Office for pricing and entering to the Costs, the duplicate being retained in the book.

## DELIVERY AND CARRIAGE RECORD BOOK.

Date........................19.... No.......

| Order No. | Quantity Sent | Job | Town sent to | How sent | Weight C. Q. lbs. | Rate per | Productive | Non-Productive |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | £ s d | £ s d |
| | | | | | | | | |

| Entered by | Extended by | Checked by | Transferred by | | | |
|---|---|---|---|---|---|---|
| | | | | Total .. £ | | |

Outwork is entered from the invoices or the Purchases Day Book (p. 42), and manufactured stock from the Manufactured Stock Issued Records (p. 37).

Sales are posted from the Sales Day Book, thus ensuring that every item delivered is charged to the customer.

When the job is finished, we have got all the Material Issued and time spent upon it, together with all necessary details and costs incurred, entered on the Cost Ticket from the records which have come into the Cost Office, and we have only to calculate and make up the cost in the following manner :—

The Work Tickets of completed jobs come daily to the Cost Office, and to these tickets is attached a file copy of the job.

The Cost Clerk takes the corresponding Cost Tickets out of the Work in Progress binder, and places them in another binder—"Completed Jobs for Costing and Pricing."

## SALES DAY BOOK.

| Order No. | Quantity | Customer and Description of Goods | Ledger Folio | Price | Per | Dr. | Cr. |
|---|---|---|---|---|---|---|---|
| | | | | | | £ s d | £ s d |

The time booked to the job is criticised, the number of runs checked, the quantities at piece rates totalled and checked by the clerk, who also checks the amount of material used with that entered on the Work Ticket and that required to produce the necessary copies, and if he is satisfied that all items are technically correct, he applies the rates per hour for productive wages and departmental charges, and so arrives at Process Cost. On this he calculates the percentage for General Charges Manufacturing, brings forward the Cost of Material and Material Departmental Charges, adds outwork, and so obtains the total Manufacturing Cost.

To the total manufacturing cost he adds Manufactured Stock Issued, Carriage, and the percentage for Selling Expenses, and so arrives at the total cost of the job.

The Charge to Customer, Manufactured Stock, Rejected Sketches, Work for Self or other Nominal Accounts, is filled in, and the total charge obtained. The difference is Profit or Loss on the job.

## COST AND SALES SUMMARY of......................ORDERS. 19.... No....

(Traveller's Name.)

| Job | Order No. | Process Cost | G.C. Manufacturing | Total Material Cost | Outwork | Total Manufacturing Cost | Cr. Stock | Carriage | G.C. Selling | Total Cost | Profit | Loss | Dr. Customer | Dr. Stock | Dr. Nominal Accounts |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Final Figures.*<br>*Traveller, and District covered.* | | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ | £ |
| J. Smith, London District .. .. .. | .. | 2 800 | 700 | 2,922 | 200 | 6,622 | 150 | 150 | 775 | 7,697 | 553 | 200 | 7,750 | 300 | |
| T. Brown, Lancashire District .. .. | .. | 2,400 | 600 | 1,500 | 300 | 4,800 | 200 | 140 | 564 | 5,704 | 836 | 500 | 5,640 | 400 | |
| S. Jones, Midlands District .. .. .. | .. | 2,400 | 600 | 1,189 | 300 | 4,489 | 100 | 130 | 543 | 5,262 | 618 | 300 | 5,430 | 150 | |
| L. Wright, Southern District .. .. .. | .. | 1,560 | 390 | 1,217 | 300 | 3,467 | 50 | 80 | 428 | 4,025 | 305 | 50 | 4,280 | | |
| Rejected Sketches .. .. .. .. | .. | 320 | 80 | 44 | 56 | 500 | .. | .. | .. | 500 | .. | .. | .. | .. | 500 |
| Work for Self .. .. .. .. .. | .. | 120 | 30 | 28 | 22 | 200 | .. | .. | .. | 200 | .. | .. | .. | .. | 200 |
| Total .. .. .. | £ | 9,600 | 2,400 | 6,900 | 1,178 | 20,078 | 500 | 500 | 2,310 | 23,388 | 2,312 | 1,050 | 23,100 | 850 | 700 |
| | | | | | | | | | | £25,700 | | | £25,700 | | |

C. & S.S. Profit, *Less* Loss .. £1,262

As Selling Expenses (Discounts, Commission, &c.) vary with the value of Goods Sold, and not Goods Produced, these expenses should be calculated, in costing, as a percentage on the charge to customer.

Rejected Sketches and Work for Self incur no selling expenses, and therefore should not be charged with same.

When the costs of completed jobs are made up they are entered in the Costs and Sales Summary, a separate sheet being used for each traveller. By this means the total of each traveller's turnover, and the percentage of profit on his orders, is ascertained, and a glance down the Loss column reveals those jobs on which you are losing money.

It is also possible to dissect each traveller's expenses, and levy them as a Selling Expense on his own orders.

Knowing the production of the Works, i.e. debits to Work in Progress or Cost Tickets—(p. 52)—and knowing the total of the Cost and Sales Summary or Credit to Work in Progress, we have effective control of the difference in Stocks, as shown on the Trading Account (p. 40), for we know the value of Work in Progress at any moment.

## CHAPTER IX.

## MANAGEMENT FROM COST RECORDS.

Given a reliable system of Cost Records it is unnecessary for the manager to be constantly running up and down the works, worrying himself over trifles which can properly be left to a subordinate. Rather he should be the mind, the controlling influence, the guiding hand of the business.

He is able to save pounds by a careful study of the Cost Records, by keeping expenses normal, and insisting upon a sufficient amount of production from the workrooms, whereas if he tries to do this without the Cost Records he will scarcely save a halfpenny.

Bad manufacturing, spoilt work, leakage of time and of material—in fact, every fault of production—is clearly shown in the costs. Productive workers are often engaged non-productively waiting for stone, forme, and similar items. The departments are not credited with the time so spent, because during that time they have earned nothing, but they could have earned, during that time, not only the wages, but a portion of the expenses.

Items such as these reduce the efficiency of the departments and increase the cost per hour of productive work. It is therefore essential that they should be reduced to the absolute minimum.

## FORM FOR ASCERTAINING THE EXACT FINANCIAL POSITION AT ANY MOMENT.

| Expenses to Date | Amount £ | s | d |
|---|---|---|---|
| Wages paid | 8,900 | 0 | 0 |
| Material consumed | 6,400 | 0 | 0 |
| Outwork | 1,000 | 0 | 0 |
| Carriage | 500 | 0 | 0 |
| Rent, Rates, Taxes, &c. | 550 | 0 | 0 |
| Plant and Machinery, R. & A. | 200 | 0 | 0 |
| " " Insurance | 150 | 0 | 0 |
| " " Depreciation | 400 | 0 | 0 |
| Motive Power Purchases | 250 | 0 | 0 |
| Travellers' Salaries and Expenses | 750 | 0 | 0 |
| Commission on Sales | 200 | 0 | 0 |
| Incidental Expenses | 400 | 0 | 0 |
| Depreciation of Stocks | 500 | 0 | 0 |
| Insurance | 100 | 0 | 0 |
| Directors' Remuneration | 500 | 0 | 0 |
| Bad Debts | 50 | 0 | 0 |
| Discount on Sales | 400 | 0 | 0 |
| Total | 21,250 | 0 | 0 |
| *Rejected Sketches | 500 | 0 | 0 |
| *Work for Self | 200 | 0 | 0 |
| Manufactured Stock Issued | 600 | 0 | 0 |
| Total Expenses | £22,550 | 0 | 0 |

| Production to Date | Productive £ | s | d | D.C. £ | s | d |
|---|---|---|---|---|---|---|
| Artists' Department | 1,000 | 0 | 0 | 187 | 0 | 0 |
| Transfer " | 700 | 0 | 0 | 633 | 0 | 0 |
| Litho Machine " | 1,000 | 0 | 0 | 400 | 0 | 0 |
| " " | .. | | | 427 | 0 | 0 |
| " " | .. | | | 133 | 0 | 0 |
| Composition " | 500 | 0 | 0 | 500 | 0 | 0 |
| Letterpress Machine Department | 1,000 | 0 | 0 | 400 | 0 | 0 |
| " " " | .. | | | 500 | 0 | 0 |
| " " " | .. | | | 50 | 0 | 0 |
| Bindery Department | 1,200 | 0 | 0 | 480 | 0 | 0 |
| Process Cost | £5,400 | 0 | 0 | £3,710 | 0 | 0 |
| Material | £6,000 | 0 | 0 | £600 | 0 | 0 |

| Summary | £ | s | d | £ | s | d |
|---|---|---|---|---|---|---|
| Productive Wages | 5,400 | 0 | 0 | | | |
| Departmental Charges | 3,710 | 0 | 0 | | | |
| Process Cost | | | | 9,110 | 0 | 0 |
| General Charges, Manufacturing, 25% | | | | 2,277 | 0 | 0 |
| Material | 6,000 | 0 | 0 | | | |
| " D.C. | 600 | 0 | 0 | | | |
| Total Material and D.C. | | | | 6,600 | 0 | 0 |
| Outwork | | | | 1,000 | 0 | 0 |
| Total Manufacturing Cost | | | | 18,987 | 0 | 0 |
| Cr. Manufactured Stock | | | | 600 | 0 | 0 |
| Carriage | | | | 480 | 0 | 0 |
| General Charges Selling, 10% of Sales Price | | | | 2,310 | 0 | 0 |
| Total Production | | | | £22,377 | 0 | 0 |

*See* Page 40.

*See* Page 52.

*These are taken from the Cost and Sales Summary, Page 63.

### ADJUSTMENTS.

| | Profit £ | s | d | Loss £ | s | d |
|---|---|---|---|---|---|---|
| Difference between Expenses and Production | | | | 173 | 0 | 0 |
| Profit on Completed Jobs from the Cost and Sales Summary | 1,262 | 0 | 0 | | | |
| Cost over-recovered on Completed Jobs | 11 | 0 | 0 | | | |
| Incidental Profit—Discount on Purchases | 00 | 0 | 0 | | | |
| Total | £1,673 | 0 | 0 | 173 | 0 | 0 |
| Less Loss | 173 | 0 | 0 | 173 | 0 | 0 |
| Actual Financial Position agreeing with Trading Account | £1,500 | 0 | 0 | | | |

This is over-recovered owing to the fractional parts of a penny which are always taken as a penny when calculating Job Cost. It is ascertained thus:—

| | £ | s | d |
|---|---|---|---|
| Opening Stocks, Work in Progress | 6,000 | 0 | 0 |
| Plus Production | 22,377 | 0 | 0 |
| Balance over-recovered | 11 | 0 | 0 |
| Total | £28,388 | 0 | 0 |

| | £ | s | d |
|---|---|---|---|
| Total Cost of Completed Jobs Cost and Sales Summary | 23,388 | 0 | 0 |
| Plus Closing Stocks | 5,000 | 0 | 0 |
| Total | £28,388 | 0 | 0 |

When making the Daily Analysis of Wages and Machinery Output (pp. 30, 31, 32), the Cost Clerk notes all items which require immediate attention on a Production Lost form.

## PRODUCTION LOST.

..................Dept. Date..................19....

| Name | Record of Time | Total Hours | At | Production Lost | |
|---|---|---|---|---|---|
| | | | | Wages | D.C. |
| | | | | £ s d | £ s d |
| | | | | | |
| Investigated by | Manager's Initials | | TOTAL | | |

The matter is then investigated by the manager, who gives the necessary instructions in order, if possible, to avoid a repetition of the loss.

The producing departments are tied up. They cannot wriggle from the net in which the astute manager holds them. If their production is insufficient he insists upon an improvement. If they increase their production by booking time to jobs which should be recorded as non-productive, the job costs too much and they are caught again. It is impossible to escape; inefficiency, wherever it is, of whatever cause, comes to light in the costs.

---

## DEPARTMENTAL PROFIT OR LOSS STATEMENT.

| Department | Actual Expenses | | Actual Production | | Profit | Loss |
|---|---|---|---|---|---|---|
| | Productive Wages | Departmental Charges | Productive Wages | Departmental Charges | | |
| | £ s d | £ s d | £ s d | £ s d | £ s d | £ s d |
| Artists | 1,000 0 0 | 190 0 0 | 1,000 0 0 | 187 0 0 | .. | 3 0 0 |
| Transfer | 700 0 0 | 650 0 0 | 700 0 0 | 633 0 0 | .. | 17 0 0 |
| Litho. Machine | 1,000 0 0 | 1,015 0 0 | 1,000 0 0 | 960 0 0 | .. | 55 0 0 |
| Composing | 500 0 0 | 545 0 0 | 500 0 0 | 500 0 0 | .. | 45 0 0 |
| Letterpress Machine | 1,000 0 0 | 915 0 0 | 1,000 0 0 | 950 0 0 | 35 0 0 | |
| Binding | 1,200 0 0 | 545 0 0 | 1,200 0 0 | 480 0 0 | .. | 65 0 0 |
| Total | £5,400 0 0 | £3,860 0 0 | £5,400 0 0 | £3,710 0 0 | £35 0 0 | £185 0 0 |

FINAL SUMMARY.

| | Actual Expenses | Actual Production | Profit | Loss |
|---|---|---|---|---|
| | £ s d | £ s d | £ s d | £ s d |
| Productive Wages | 5,400 0 0 | 5,400 0 0 | | |
| Departmental Charges | 3,860 0 0 | 3,710 0 0 | .. | 150 0 0 |
| General Charges, Manufacturing | 2,110 0 0 | 2,277 0 0 | 167 0 0 | |
| Productive Material | 6,000 0 0 | 6,000 0 0 | | |
| Material D.C. | 635 0 0 | 600 0 0 | .. | 35 0 0 |
| Outwork | 1,000 0 0 | 1,000 0 0 | | |
| Manufactured Stock Cr. | 600 0 0 | 600 0 0 | | |
| Carriage | 480 0 0 | 480 0 0 | | |
| General Charges, Selling | 2,465 0 0 | 2,310 0 0 | .. | 155 0 0 |
| Total | £22,550 0 0 | £22,377 0 0 | 167 0 0 | 340 0 0 |
| *Less* Profit | | | 167 0 0 | 167 0 0 |
| Leaving Loss on Manufacturing | | | .. | 173 0 0 |
| Profit on Completed Jobs from the Cost and Sales Summary | | | 1,262 0 0 | |
| *Cost Over-Recovered on Completed Jobs | | | 11 0 0 | |
| Incidental Profit, Discount on Purchases | | | 400 0 0 | |
| Total | | | 1,673 0 0 | 173 0 0 |
| *Less* Loss | | | 173 0 0 | 173 0 0 |
| Net Profit agreeing with Trading Account | | | £1,500 0 0 | |

* See Page 67.

The Actual **Expenses** are taken from the **Summary** of the Analysis of **Expenses** Page 49, and the Actual Production from Page 52.

From the Analysis of Purchases in the Purchases Day Book (p. 43) it is possible to control the expenditure under each heading, and so prevent any undue increase in cost of these expenses.

From the Cost and Sales Summary (p. 63), you know the profit on each traveller's orders, and from the Index to the Order Book (p. 55) you ascertain the value of any customer's account from a profit-making point of view, and can form a reliable idea of the date when he will require repeat orders. Jobs on which you are constantly losing money are automatically sorted out, and either refused or a higher price demanded.

The Cost Tickets are kept on the loose-leaf principle. When issued they are placed in numerical order in the Work in Progress File. On final delivery of the goods they are taken out of this file, and after the final calculations of Cost, and the entry in the Cost and Sales Summary, are filed away in numerical order with the other completed Cost Tickets, thus forming a permanent and easy reference.

Thus at any time the Work in Progress Cost Tickets will represent those orders only which are in hand, and any job which is hanging about, or not being proceeded with, will automatically come to the front.

Outstanding orders are periodically written up from the Cost Tickets which remain in the Work in Progress File.

These are investigated, thus preventing any order being overlooked or hanging about for an indefinite period.

Amongst other information you know the production of the works (p. 52), the consumption of the stores (p. 38), the value of your stocks, and the profit or loss on any department of your business. (p. 69).

It is possible to know each week the exact financial position of the business (p. 66), because you know the expenses to date,

## OUTSTANDINGS.

..........................19....

| Date of Order | Customer | Description of Job | Quantity Ordered | Order No. | State of Job | Reason for Delay |
|---|---|---|---|---|---|---|
| | | | | | | |

| Investigated by | Manager's Initials |
|---|---|
| | |

the production to date, and the profit on completed jobs from the Cost and Sales Summary.

A knowledge of this alone is a most valuable argument in favour of a Costs Department.

Amongst other information you are able to ascertain the profit or loss on any job and a fair selling price. There is an effective check upon all estimated jobs, it being possible to know, even before the job is completed, whether it will result in a profit or a loss.

You cannot possibly make a loss without knowing it, knowing where it is, why it is, and how to prevent it in the future.

The cost of doing this work is infinitesimal compared with the value received and the saving effected. You can possibly save the extra expense in some other portion of your office, the working of which a Costs Department would simplify. The saving in non-productive labour, the increased output, and other advantages more than compensate for any extra cost in your office.

A Costs Department is the best investment that can be made, providing the energy devoted to it is skilfully directed, and is not diverted into channels which lead nowhere.

There must be, underlying any satisfactory cost system, this great outstanding principle. The money spent on Costing must be so spent that it returns, with increased interest, the outlay. It must, by giving knowledge, increased production, and lesser non-production, itself be a profitable department, and this can only be if the underlying principles of the system are on a sound and scientific foundation.

## CHAPTER X.

## COST ACCOUNTS.

### DEPARTMENTAL DEBITS AND CREDITS

Let us now briefly review the system outlined in this volume.

Wages, both Productive and Non-Productive, and all expenses incurred in, and by, each department are debited to the department concerned (Analysis of Expenses, p. 41).

Credit is given each department for the value of work produced at its Process Cost, i.e. its Productive Wages plus its Departmental Charges—(Summary of Production, p. 52). This in its turn is debited to Work in Progress or Cost Tickets (pp. 58 and 59) from the daily Time Sheets (pp. 25, 27, and 28).

Material, when purchased, is charged to a Stores Account. Stores are credited with the material when issued, and Work in Progress, or, in the case of non-productive material, the department's being debited.

Outwork, i.e. a direct purchase for a given job, and Carriage are also debited to Work in Progress—Outwork from the Purchases Day Book, and Carriage from the Delivery and Carriage Record (p. 61).

Thus we have debited to Work in Progress, or have accumulated on the many Cost Tickets representing Work in Progress, all the different items of cost incurred in the production and distribution of the goods. Our total debits to Cost Tickets represents the total credits to the various departments.

When the jobs are sent home, Work in Progress is credited, and Finished Work debited on the Cost and Sales Summary (p. 63).

Sales are posted to the Cost Tickets from the Sales Day Book (p. 62), and this gives the Credit to the Finished Work Account. The balance being Profit or Loss as shown on the Cost and Sales Summary.

Therefore, any profit or loss on the various departments, on the various stores, on General Charges, Manufacturing and Selling, together with any incidental profits and the cost over-recovered in crediting Work in Progress by always reckoning a fraction of a penny as a penny when calculating the cost of individual jobs will agree with the profit as shown by the Trading Account. (p. 69).

It is not essential, but in some houses it may be considered desirable, to keep a series of Accounts in a Cost Ledger, and in case this is desired the necessary details are to hand ready for posting to the various Cost Accounts.

In considering the selling value of the article produced, you have to remember that selling value remains the same whether the job is done by a boy or the highest paid man on the floor, whether it is worked off at 500 or 1,000 per hour. The cost alone varies.

Costing enables you to ascertain whether you have made a profit or loss on individual orders, as well as on your departments—it reveals your weak points, provides a useful and satisfactory check upon your estimates, it indicates the financial progress of your business, and enables you to anticipate the Balance Sheet.

It is essential that Costs should be kept on a scientific basis in order to secure accuracy in estimating and also in fixing the selling price of the goods produced, for upon this depends, to a very great extent, the success or failure of many businesses.

It is no use asking a manufacturer to change his basis unless you can show him a better way and convince him that he is working on wrong lines.

I have endeavoured to prove that the varying methods of recovering the expenses are a source of loss to many houses. It is the cause also of much absurd price-cutting—often innocently done—resulting in unprofitable trading.

By the introduction of Costing on a reliable and scientific basis much loss can be avoided, and the prosperity of the works and also the workers be greatly increased.

## CHAPTER XI.

## ASCERTAINING POTTERY COSTS.

No system can be taken exactly as it stands and applied to every house.

Different businesses and different factories require treatment according to the technique of the trade carried on, but the underlying basic principles are—they must be—the same.

There is only one sound system of ascertaining Cost, and that is one which charges against each department or process the actual costs incurred in, and by, that department or process and recovers that cost on the production of that department.

In this chapter I propose briefly to discuss the application of those principles to the manufacture of Pottery Ware—one of the great localised industries of this country—and one which differs greatly in every respect from the Printing and Allied Trades, to which this volume has, up to the present, been devoted.

We have an entirely different series of departments or processes, but we must ascertain the cost of each department or process—allocating the expenses over the departments by means of an Analysis of Expenses similar to that shown on p. 41.

Let us say that we have the following departments.

1. The Prepared Clay Department taking the cost of mixing and preparing the clay for the use of the potter.
2. The Mould Making Department, which produces the moulds, as required, to replace those worn and no longer serviceable.
3. The Making Department, where the clay is fashioned either by Pressing, Throwing, Casting, or any other process of manufacture.
4. Saggar Making, where the Saggars are made in which the articles will be fired.
5. Biscuit Kiln, which includes placing the articles in the Saggars, firing the kiln, drawing and passing the fired ware to the
6. Biscuit Warehouse or Stores through which all the various articles must pass.

   This department or Store can be regarded as the finish of the first stage of manufacture. We have a definite break, and can issue the biscuit ware as the raw material for further work as required.
7. The Printing Department, where the pattern is put on the ware.
8. The Glaze Department, where the glaze is prepared for the
9. Dippers, who coat the ware before it is passed on to the
10. Glost Kiln, where it is again placed in Saggars and fired before being passed to
11. The Glost Warehouse. Here is another definite break—the second definite stage of manufacture.

    From here the article may be sold, either in its white or printed form, or it may be issued to the

12. Decorating Department, the necessary painting or transfer being put on, when it is again fired in an
13. Enamel Kiln, and passed to the
14. Decorated Warehouse or Stores—the third and final stage of manufacture.

Up to this point we must recover all the costs of manufacturing. It is our Total Manufacturing Cost.

When we sell the articles we have to incur other expenses.

15. Packing, Crates, Straw, Carriage, &c., which are dependent entirely upon selling. These should be treated as a separate department, and the cost recovered upon each consignment. It is a definite ascertainable cost which can be charged against each order.
16. Actual Selling Expenses, i.e. Travellers' Salaries and Commissions, Bad Debts, Selling Office Expenses, &c., should be recovered by reckoning the total of these items as a percentage on the sale price.

We have, therefore, to take the total expenses of the factory as shown by the Trading Account, and by an analysis of those expenses ascertain the cost of running each department as if it were a separate business. We have also to ascertain the Cost of General Charges Manufacturing, and General Charges Selling.

Having debited each department with its expenses, we must credit them with the value of work produced; in other words, we must recover the expenses of the departments on their production.

## CHAPTER XII.

## RECOVERING POTTERY COSTS.

We will now consider how to recover the Cost of Manufacture upon the various articles produced. In order to do this we must find the unit of production in each department.

In the prepared clay department the unit will be the amount of clay produced. The total number of cwts. or lbs. of clay produced divided into the total cost of the department giving a cost per cwt. or lb.

Moulds may be charged as an expense of the Making Department, or, in factories where they can be definitely reckoned in the cost of the article produced, they may be treated as a productive item, and the percentage of mould making expenses recovered as a percentage on the Mould Makers' Productive Wages.

In the Making Shops wages are, as a rule, on a piece-work basis, whether paid good from hand or good from oven. A percentage to cover departmental expenses should be added to these wages, thus increasing the cost *pro rata* per unit of production.

When the total cost of Saggar Making is ascertained in the Analysis of Expenses, the Biscuit Kiln and the Glost Kiln should be charged with the Saggars consumed by them. Consequently the cost of Saggars will be recovered in the cost of firing.

The cost of Biscuit Firing will be recovered on the basis of capacity. The cost per kiln can be ascertained by dividing the total cost of firing, &c., into the number of kilns fired. Each kiln has a capacity of so many Saggars. Each Saggar has a capacity of so many articles. Therefore, the cost of this department should be recovered as a cost per Saggar. On coming into the Biscuit Warehouse the goods can be regarded as going to stock, the cost of manufacturing up to this point being the price at which the article is put to stock.

We have, therefore, a debit to Biscuit Warehouse, the total of which should be equal to the total cost of all departments up to Biscuit, including loss to Biscuit through breakage, faults and firing, the various departments up to Biscuit being credited with that amount.

On being issued from Biscuit Warehouse for further work, Biscuit Warehouse should be credited, and Work in Progress Biscuit to Glost debited. The balance remaining is the value of Biscuit Stock at any time.

The Printing Departmental Expenses would be recovered as a percentage on the productive wages of the department.

Glaze, according to the quantity used. Dipping Expenses as a percentage on the productive wages.

Glost firing, like Biscuit firing, must be calculated on the capacity basis of the oven, and recovered over the different articles according to the space occupied. The Saggar here again provides a useful and standard unit.

Now that the goods have arrived in the Glost Warehouse, another definite stage of manufacture is concluded, and Glost Warehouse should be debited with the articles at the Biscuit Warehouse price, plus the cost of further work done, giving a cost to glost.

Work in Progress, Biscuit to Glost, and the departments from Biscuit to Glost being credited and Glost Warehouse debited.

By this means the total cost of production up to this point is recovered, including losses through breakage faults and firing.

If the goods are sold white or printed, i.e. without any further work being done, Glost Warehouse would be credited, and Sales debited, but if the articles have to undergo further processes, such as Decorating, &c., then Work in Progress, Glost to Decorating would be debited on the issue from Glost Warehouse, Glost Warehouse being credited. The balance remaining is the value of Glost Stock at any time.

Decorating Expenses would be recovered as a percentage upon the Productive Wages and the cost of Enamel firing on the capacity basis, the goods eventually going into the Decorated Stores, and the final stage of manufacture concluded.

Decorated Warehouse or Stores would be debited with the articles at the Glost Warehouse price plus the cost of further work done, giving the Decorated Cost. Work in Progress Glost to Decorating, and the Departments from Glost to Decorating being credited.

By this means the total cost of production, whether the articles are in a Biscuit, Glost, or Decorated state, has been ascertained, and the cost of running each department recovered on the production of the respective departments.

On the articles being sold, the Glost or Decorated Stores should be credited at their stock price, which is also cost price, and Sales debited, the cost of packing, &c., and the selling expenses and profit added, giving the sale price.

We have, therefore, three definite checks upon our costs, viz. :—

The debits to Biscuit Warehouse should equal the Cost of Manufacturing to Biscuit.

The credits to Biscuit Warehouse, plus the cost of manufacturing from Biscuit to Glost, should equal the debits to Glost Warehouse.

The credits to Glost Warehouse of goods for further work, plus the expenses of all departments from Glost to Decorating, should equal the debits to Decorated Stores.

Taken together, we get the Total Manufacturing Cost.

The Cost to Biscuit, Glost or Decorating for the various articles would be calculated for, say, 20 dozen or 240 pieces. This would then become a standard cost, or rather a standard credit to Departments, and debit to Warehouse for that article.

The following Raw Material Stores are required.

Clay.
Coal.
Printing.
Decorating.

On purchasing, Stores would be debited to one of these accounts. On consumption, the articles or the Departments would be debited and the Stores credited.

We have now very briefly considered the application of the basic principles of Costing to an industry far removed from Printing, for which this volume was originally written, and to which it is applied.

Many of the forms illustrating the text of the earlier chapters would not be required in dealing with Pottery Costing, but the principles underlying it cannot be avoided.

To go fully into the question of Pottery Costs, giving the necessary forms and worked examples, would necessitate another volume being written.

The drafting and putting into operation of these forms can easily be done by anyone understanding the technique of the business, once they have settled the basis and the lines on which to proceed.

I hope that I have thrown some light on the way to go in these small chapters on the application of Costing principles to Pottery manufacture.

## CHAPTER XIII.

## COTTON SPINNING AND WEAVING COSTS.

In considering the application of Costing principles to Cotton Spinning and Weaving—another of our great localised industries—we must again get down to the Departmental or Process Cost, charging against each department the expenses incurred by that department, and recovering those expenses upon its production.

The Blow Room Expenses would be recovered as a cost per lb. of cotton cleaned.

The Card Room would be credited with its production, and recover its expenses at a price per hank.

The Spinners' Expenses will be recovered as a percentage on the Productive Wages, for the wages vary according to the count being spun.

Winding and Warping also as a percentage on the Productive Wages.

Drawing and Reaching at a price per 1,000 ends.

Weaving Expenses as a percentage on the Productive Wages.

Cloth Room Expenses, i.e. cut looking, sorting, &c., is to be taken at a price per cut, or piece, woven.

So far we have not considered Productive Material—cotton and size.

Size must be recovered by ascertaining the quantity used for each particular kind of cloth. It should not be averaged, because it varies in quantity, composition, quality, and value, according to the cloth being manufactured.

Cotton requires more consideration, for we have not only the cost of the Raw Material per lb., but also the cost incurred in getting it into the factory and the loss through waste.

We very probably also have an item Differences on Futures. This item, where it occurs, should be regarded as quite distinct from manufacturing. It has no relation thereto, and should go into an entirely separate account from the factory, and be shown as an Incidental Profit or Loss, quite apart from, but in addition to, manufacturing.

Having eliminated futures from the question, we have charges on cotton which should be worked out to a cost per lb., and added to the cost per lb. of cotton.

Waste should be controlled by a Waste Department, all the expenses of its collection and sale being debited to it, and the amount received for its sale credited. The difference, i.e. the net receipts from the sale of waste, after paying the cost of its collection and sale, will go to reduce the amount of loss which will have to be added to the cost per lb. of cotton cleaned.

It is advisable to make a clean break between Spinning and Weaving and between Weaving and Sales.

In the case of Spinning, the finished product of Twist or Weft going into Yarn Stores at a cost price per lb., according to the count, and being issued as required to the Weaving Department.

In the case of Weaving, the cloth going into a Cloth Stores and being issued as required to Selling.

Thus we get three distinct sections, and each section should recover its total expenses on its total production.

The Cost of Yarn will vary according to its Count, and may be ascertained thus :—

Cotton + Charges on Cotton + Waste at per lb.

Blow Room Wages and Expenses at per lb.

Card Room Wages and Expenses at per hank.

Spinners' Wages + % for Expenses, giving a total cost for a certain quantity of yarn produced, and passed into Stores.

The total debits to Yarn Stores at cost price should equal the total cost of all spinning departments.

On being issued from Stores, the Weaving Department would be debited, and Yarn Stores credited, the balance of the account showing the value of stock of yarn on hand.

The cost of a piece of cloth will be ascertained thus :—

lbs. Twist from Store @ per lb.
,, Weft ,, ,, @ ,, ,,
Winding and Warping Wages + % for Expenses Slashing at a price per cut.
......lbs. of size at a price per lb.
Drawing ......... ends at per 1,000 ends
÷ the number of cuts

Weaving Wages, plus % for Expenses, Cloth Room, Looking, &c., at a price per cut. This gives the Manufacturing Cost, to which must be added a percentage to cover loss on Seconds, giving the Total Manufacturing Cost, at which price the goods are debited to Cloth Stores.

The total debits to Cloth Stores should equal the credit to Yarn Stores, plus all expenses of weaving up to Cloth Stores.

On the sale of the goods, Cloth Stores would be credited at stock price, and to this is added Packing Wages and Expenses, Packing Materials—Carriage, Insurance, and Selling Expenses equalling Total Cost. The difference between Total Cost and Sale price is profit or loss.

In many factories the cloth produced will go direct from the Cut lookers to the Stampers and Packers. In others there will be no convenience for a Cloth Stores, but in either case a record should be kept of the number of pieces and kind of cloth handed over, or produced, in order that this record may act as both a debit and a credit to the Cloth Stores, so that the production up to that point may be ascertained, and the Weaving Departments credited with their production.

It is impossible, in this volume, to discuss the application of Costing to Cotton Spinning and Weaving at any length. I can only say that when worked out on a departmental basis, results are often shown which do not come to light when the Costs of Manufacturing are taken in bulk.

I have endeavoured to outline the principles which should be followed, so that those interested in this subject may have guidance along the lines that should be followed, should they, at any time, be called upon to draft the necessary forms and put into operation the records which would be required to install a Cost System.

## CHAPTER XIV.

## COSTING FOR THE SMALL MANUFACTURER.

THE man working on his own account, or in business in a small way, employing say a dozen hands, usually relies upon personal supervision and rule of thumb methods in fixing prices rather than actual cost records or decently kept accounts.

To him a Cost System would be extremely valuable, it would show him the way he should go in order to develop his trade, increase his plant, and build up a prosperous and remunerative business, but he fails to see how he can find the time, in addition to his ordinary duties, to do the necessary clerical work involved.

He is sufficiently occupied, so he thinks, in keeping a Purchases Day Book, Sales Day Book, Cash Book and Ledger.

The Works records will certainly be meagre, but he will have some form of Orders Received Book, a Work Ticket, which also will very probably contain space on which to estimate the cost of the job. He may, or may not, have time sheets rendered by the workers engaged upon productive work.

He probably will have fixed hour rates for each process or machine which he uses for estimating the value of a job, and taking these rates as a commencing basis I will show how he can commence his Cost System without involving himself in any extra clerical labour.

The manufacturer also, who does not wish to go fully into the costing explained in the previous chapters, but is desirous of going some distance along the road, who desires to gradually develop his system, rather than suddenly plunge into new methods, I would recommend to take the Trading Accounts for the past three years and compile an estimated Trading Account for the ensuing period.

He should then analyse the estimated expenditure over the departments in order to ascertain the probable cost of running each of these departments.

Say the estimated expenditure for the twelve months is—

| | £ |
|---|---|
| Wages | 1,750 |
| Productive Material | 1,400 |
| Non-productive Material | 100 |
| Outwork | 250 |
| Carriage | 100 |
| Rent, Rates, Taxes, &c. | 100 |
| Plant and Machinery— | |
| R. & A. | 50 |
| Insurance & Depreciation | 150 |
| Principal's Salary | 350 |
| Motive Power | 50 |
| Incidental Expenses | 50 |
| Discounts | 100 |
| Own Work | 50 |
| Total Estimated Expenditure | £4,500 |

And the analysis of the estimated expenditure shows :—

| | £ |
|---|---|
| Composition | 600 |
| Machine | 1,000 |
| Bindery | 750 |
| Total Labour Cost | 2,350 |
| Material | 1,400 |
| Outwork | 250 |
| Carriage | 100 |
| Total Works Cost | 4,100 |
| Selling Expenses | 400 |
| Total Production required | £4,500 |

The departments will each have to work a sufficient number of productive hours at the inclusive rates per hour for wages, departmental, and general manufacturing charges in order to recover their expenses.

The forms required are :—

1. A Work Ticket and a Cost Ticket for each job.
2. A Time Sheet from each employee engaged upon productive work, i.e. work chargeable against particular jobs.
3. A Weekly Summary of Production.
4. A Costs and Sales Summary.

The Work Ticket and the Cost Ticket will be a very simple form. The Work Ticket being similar to that shown on p. 56, but the Cost Ticket will be simpler than that shown on p. 58, for the Productive Wages, D.C. and G.C. will all be included in the rate per hour used for each process or machine.

The Summary on our Cost Ticket will be :—

| | | |
|---|---|---|
| Composition, | hours at | |
| Machine | ,, | |
| Bindery | ,, | |
| Total Labour Cost | | £ |
| Material | | |
| Outwork | | |
| Carriage | | |
| Total Works Cost | | £ |
| Selling Expenses | | |
| Total Cost | | £ |
| Profit | | |
| Loss | | |
| Charge to Customer | | £ |

and the headings of the Cost and Sales Summary will be the same, agreeing with the Summary of our Cost Tickets, and also in agreement with the form in which we make out the Analysis of the Estimated Expenditure.

**WAGES RECORD.** Week ending..............................19.....

| No. | Name | Hours Worked. | | | | | | Total | Rate | Amount | Less Insurance | Net | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | S. | M. | Tu. | W. | Th. | F. | | | | | | |
| | | | | | | | | | | £ s d | | £ s d | |

**SUMMARY OF PRODUCTION.** Week ending..............................19....

| | Name | Process | Productive Hours | | | | | | Total | Rate per Hour | Value Amount transferred to Cost Tickets | Non-Productive Hours | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | S. | M. | Tu. | W. | Th. | F. | | | | S. | M. | Tu. | W. | Th. | F. |
| | | | | | | | | | | | £ s d | | | | | | |

The Summary of production, too, will be kept in a simple form, showing how much time for each process or machine has been worked productively and charged to the Cost Tickets. This will be worked out at the rates per hour (inclusive of wages and all expenses) and will give the value of work produced.

From our Trading Account we find that the expenses, other than Wages, Outwork and Productive Materials, are, say, £20 per week.

Each week, then, the value of work produced and debited to Cost Tickets should be £20 more than the wages paid that week. If the Expenses, other than Material and Outwork, are debited to Cost Tickets, and if all the Material consumed on jobs and the Outwork purchased for jobs is also entered to and recovered on Cost Tickets, the total cost of jobs as shown when the Cost Tickets are calculated, will represent the total expenses of running the business for the period.

The difference between the Total Cost of a job and its Sale price is either profit or loss.

A Summary of these Cost Tickets—the Cost and Sales Summary (p. 63)—will show the total profit or loss on all jobs, and if the total expenses are recovered in the total cost, the balance of profit or loss will agree with the Trading Account.

If the weekly production falls short of that required to cover expenses, there will be a loss on the Total Labour Cost. If the Material consumed is not all entered to the Cost Tickets, there will be a loss on Stores. If Outwork purchased is not entered to its Cost Ticket there will be a loss on that section; and these losses, which efficient management should remove, must be deducted from the profit shown by the Cost and Sales Summary, in order to reconcile the Cost figures with the actual result of the trading.

Let us just consider this for a moment. We say our total expenditure of all kinds will be £4,500. We require a production from the works of the same amount. If we incur those expenses and get that production, any difference between the total cost and the charge to customer, shown on Cost Tickets, will be real profit or loss, agreeing with the Trading Account.

If, however, our expenses exceed the amount allowed, we are so much to the bad. If our expenses do not reach that amount, we have a balance to the good.

If our production does not reach the amount required we have to deduct the deficit from the profit shown on the Cost and Sales Summary. If our production exceeds the amount required we have that amount of profit over and above that shown on the Cost and Sales Summary.

We therefore have to make the following adjustments in order to effect the reconciliation of the costs with the financial accounts:—

(1) The difference between the estimated expenses and the actual expenses.

(2) The difference between the estimated production and the actual production.

(3) The difference between the total cost of completed jobs and the charge to customer as given in the Profit and Loss columns of the Cost and Sales Summary.

The system herein outlined for the small manufacturer will be found reliable, for he is able to reconcile his costs with his financial accounts. No Cost System is of any value unless this can be done.

The points necessary to watch and to control in order to assure remunerative trading are:—

(1) Keep the expenses down to the margin allowed.

(2) Keep the production up to that required.

(3) See that all productive material consumed, outwork, and carriage is entered to the Cost Tickets.

(4) See that the work is produced at a cost which will enable a profit to be shown on each job when the total time taken, material consumed, outwork and carriage, is finally calculated on the Cost Ticket.

(5) Keep the cost records up to date so that you can act promptly and with full knowledge of the facts should faults or leakage be discovered.

It is, therefore, quite possible, and quite easy, for even the small manufacturer to put his costs on a scientific basis and to reap the fruits to be gained thereby; and, as the business grows and develops, he can develop also his Costing, build up statistics and figures which will enable him to still further close the leaks, which, without the light and the knowledge gained by Costing, would have prevented the growth and the success of his business.

## CHAPTER XV.

## CONCLUSION.

I AM fully convinced that to apply satisfactorily a Cost System to any industry is a simple matter once the basic principles of ascertaining cost are understood and accepted.

I have not endeavoured, in this volume, to go fully into the details of Pottery Costing, or of Cotton Spinning and Weaving Costs, I have only endeavoured to show the way.

Anyone understanding the technique of a business, and also the basic principles of Cost Accountancy, and using that knowledge, can draw up the necessary forms and install the system.

One of the great principles to remember is that system can be carried too far. There can be so many records, and so much time spent in unnecessary detail, that production and profits suffer, but this is only when the cost system, and the various parts of it, are inefficient, or not properly carried out. It is also essential that the principles underlying the system should be on a sound basis, otherwise the results will not be satisfactory or consistent.

The great underlying principles, the vital principles, are to ascertain the cost of each department or Process, and, having ascertained that cost, to discover the Unit of production, be it wages, hour rate or capacity, and to recover that cost on the production of that department.

Given a Cost System, on a sound and practical basis, the results cannot be anything but valuable. It will be one of the best paying of all departments.

Finally, I would say that I hope this volume will be useful in assisting those who, desiring the light and knowledge to be derived from Costing, have, as yet, been unable to tread the path of progress leading to successful and remunerative manufacturing.

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